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ABSTRACT

This final report presents the results of a University of Tennessee at Chattanooga's (UTC) strategic planning study team, which was charged with documenting computerized services currently available and recommending to the UTC administration areas in which new services should be introduced at the university. A questionnaire was administered to selected faculty and staff (n=70) to pinpoint topics of major concern, and respondents were interviewed to explore their remarks on the completed questionnaires in more depth. Eleven problem areas were identified: (1) access to computing resources; (2) communications and campus-wide computer networking; (3) computer literacy; (4) hardware and software support; (5) faculty rewards to encourage faculty development of courseware and innovative use of computer technologies; (6) hardware; (7) electronic classrooms; (8) library automation; (9) policy and organization; (10) community outreach through computing services; and (11) security. Recommendations and an implementation plan are provided for each problem area. The appendixes, which make up the major part of the report, include records of correspondence; the survey instrument; names and demographics of interviewees; the matrix of analysis of responses; the computer curriculum integration survey; excerpts from the 1988 inventory of courses; hours of operation of computing facilities; and information on the members of the study team. (SD)

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FINAL REPORT OF STRATEGIC PLANNING STUDY TEAM

THE UNIVERSITY OF TENNESSEE AT CHATTANOOGA

IR 014 165

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FINAL REPORT

OF

STRATEGIC PLANNING STUDY

TEAM

July - August 1988

The University of Tennessee at Chattanooga

Submitted to Chancellor Frederick Obear
and
Provost Sandra Packard

August 25, 1988

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The University of Tennessee at Chattanooga gratefully acknowledges the consulting services provided by the IBM Corporation. Mr. Joe Davenport, Ms. Sherrye Goss, and Mr. Doxey Alston assisted the study team throughout the process and provided valuable support.

We also wish to thank Michele Siniard, Laura Davis, and Dawn Salyer for their entry of material.

The University of Tennessee at Chattanooga study team consists of the following members:

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CHAPTER 1

INTRODUCTION

Computing facilities at The University of Tennessee at Chattanooga (UTC) presently are decentralized. The major controllers of computing resources are the Center of Excellence for Computer Applications (CECA), the Lupton Library, and the Administrative Computing Center. In addition, some departments (physics, computer science, and engineering) have their own computing devices and can be deemed minor resource areas. This chapter provides an overview of the various computing facilities available to UTC faculty, staff, and students.

An indication of the importance with which computers are viewed is the fact that faculty have expended in excess of two-thirds of a million dollars of their personal funds to purchase microcomputers. The study team recognizes the major contribution which The University of Chattanooga Foundation has made in helping faculty obtain microcomputers. Since 1984 the UC Foundation has provided interest-free loans to faculty for the purchase of microcomputers and peripheral devices.

OVERVIEW OF FACILITIES

The Center of Excellence for Computer Applications (CECA)

Although the Center of Excellence for Computer Applications (CECA) was not created until 1984, The University of Tennessee at Chattanooga has been heavily involved with educational computing for many years. In 1974, in response to rising academic needs, a year long study of the state of the art in academic computing was funded. As a result of this study, the UTC Office of Academic Computing was established and an interactive computing facility was purchased. Due to the growth of demands, additional interactive facilities have been added solely for the use of faculty and students. Following the Dartmouth tradition, computing at UTC is a "free" resource, and all students are encouraged to make use of these computing resources.

In 1977, a project sponsored by the National Science Foundation and conducted by the Human Resources Research Organization surveyed 7,000 agencies and institutions for successful academic use of computers. UTC was one of the 106 educational institutions selected nationwide as an outstanding example of how to use computers for teaching and learning.

From 1975 to 1984, all educational computing resources were maintained by Academic Computing Services. In 1984 UTC instituted a Center of Excellence for Computer Applications (CECA). This interdisciplinary center uses faculty and staff from areas such as engineering, computer science, business, education, and Academic Computing. The Center does not focus solely on software associated with computer science, but rather, on a broad spectrum of computer applications from the discipline areas previously mentioned. The Center assists in graduate instruction on both the master's and post-master's level, as well as in faculty and student research.

Computer applications of major interest to CECA and to the Chattanooga region include large scale electrical power unit assignment optimization, computer aided design (CAD) and

In November 1985 an extension proposal expanded CECA's activities into the areas of computer curricular integration (CCI), rehabilitation interfaces with engineering (RIE), and knowledge engineering applications (KEA). Faculty grants from CECA support activities related to these three areas. CECA is a major regional resource for southeastern Tennessee. The emphasis on software development and applications, engineering design via computers, and support for K-12 use of microcomputers is unique in Tennessee.

The UTC mainframe computers are networked, along with a large number of terminals, through the Gandalf system. Any terminal or mainframe computer on the UTC campus can access needed resources elsewhere in the network.

UTC has a number of computer systems and several microcomputer labs which are available for use by faculty, staff and students. These facilities include the following:

Mainframes

(a) IBM 4381
(b) HP 3000 Series 950 (operational in September 1988)
(c) HP 3000 Series 58 (will be disconnected as an academic processor in late 1988)
(d) VAX 11/780 (operational in October 1988)
(e) RJE link to an IBM 3090 at UT-Knoxville (IBM and VAX systems)
Note: The IBM 4381 and HP3000 computers are available to the general UTC community; the UTK facilities are largely used by computer science and engineering students.

Terminal Clusters

a) Holt 101
b) Lupton Library (second floor)
c) Fletcher 307D
d) Grote 219
e) Grote 320

Microcomputer Labs - (CECA)

a) Hunter 407/408--equipped with 25 Mac SEs, 4 Imagewriter printers, an Apple Laser printer, 18 IBM PCs, and 18 Apple GSs
b) Grote 226--equipped with 18 PCs and two printers
c) Hunter 401 (CCI cluster)--contains 5 SEs, a laser printer, two Mac II, and 3 IBM PS/2 systems--open only to faculty.

Other Microcomputer Labs

a) Fletcher 404--contains 21 IBM PCs and 4 IBM 3179 terminals--primarily for students in the School of Business
b) Frist 203--equipped with 16 Mac Plus's--for communication students only
c) Grote 204--has 1 Altos, 1 NCR minicomputer, 1 plotter, and 3 graphic terminals--for computer science faculty and students only
d) Grote 216--12 PS/2 model 50's--primarily for School of Engineering students
e) Grote 318--with 2 Apple IIs, 2 Macs and 1 Lisa--open to Physics faculty and students
f) Race 209--contains 10 Mac SEs and 2 printers--for the use of developmental students under the jurisdiction of Special Services

f) Hunter 401 (CCI cluster)--contains 5 SEs, a laser printer, a Mac II, and 4 IBM PS/2 systems--open only to faculty.
g) Race 209--contains 10 Mac SEs and 2 printers--for the use of developmental students under the jurisdiction of Special Services

UTC is a remote job entry station of The University of Tennessee Computer Center network. Available are an IBM 3090 running MVS, an IBM 3081 running VM/CMS, and a cluster of VAX series machines running VMS. Jobs may be submitted to the IBM 3090 either from the HP3000 Series 58 or from the IBM 4381. Job turnaround is usually less than one minute. The IBM 3081 and VAX machines can be used from remote terminals on the UTC campus.

The Lupton Library

Academic libraries have been a part of American higher education since its beginning. The phrase "heart of the university" came into vogue to describe the integral role libraries play in higher education. Second only to the faculty, academic libraries serve as the most important source of knowledge on a college campus. Yet this vital asset is often taken for granted. Today's academic libraries and their staffs are caught in the middle of an information revolution, between traditional academic conservatism and the tantalizing possibilities of new technologies. As a result of burgeoning new technologies -- such as online systems, videodisks, and telefacsimile -- and a change in library philosophy from independent local collections toward shared resources, campus libraries are facing a new frontier. This frontier holds much promise, but it also holds serious implications for budgets and management which must be carefully and thoughtfully addressed.

The libraries of America's colleges and universities have never been static organizations but have always existed within and responded to the changes in the institutions of higher education which they serve. Today's libraries are in transition from manual to electronic systems. The computer has already greatly affected libraries and promises to increase that effect in the future. Electronic databases are replacing card catalogs and printed indexes and abstracts. Information is being produced and stored in new forms. The merger of computers and printing is leading to a new method of information transfer. Libraries are no longer able to be self-sufficient and, thus, must link to others through electronic networks in order to serve the information needs of their users. The changes brought about by advances in technology have been so extensive that it is difficult to assess their total effect, but it is clear that libraries are in a period of fundamental transformation. Libraries are being reinvented in an electronic environment.

In 1983, an HP3000 Series 58 computer was purchased to automate the library functions at UTC. This system is dedicated to maintaining the library system and can be accessed either from various terminals located on the main floor of the library or through a modem. Later in the same year, the Lupton Library began to automate many of its internal technical operations, including cataloging (July 1983), circulation (September 1983), and authority control (March 1984). More recently, the Library has successfully automated many of its user services, including the public access catalog (May 1984), library instruction (August 1984), interlibrary loan (July 1985), remote database search services (August 1985), and reserve reading room functions (February 1986).

In May 1984 the Library unveiled its online public access catalog, the most conspicuous and the most heralded of all its automation projects. For one year the Library chose to duplicate public access to its collections with its existent card catalog; but in May 1985 the Library froze its card catalog, i.e. ceased all card operations. From that date

For most of these projects the Library's principal vendor has been the Virginia Tech Library System (VTLS). The VTLS software allows access to the Library's full Machine Readable Cataloging (MARC) database by authors (including joint and added authors), titles (including all series titles), Library of Congress subject headings, keywords, call number, ISBN, ISSN, LCCN, and OCLC number. During 1985, the Lupton Library served as a designated test site for the VTLS word-searching software. In 1986, the Lupton Library converted its serial holdings into machine-readable form according to the relatively new MARC holdings format. This project gives students and faculty access to the Library's periodical holdings via the online catalog and lays the necessary groundwork for the automation of the Library's serials check-in and binding operations.

Administrative Computing

The offices of Administrative Computing are located in 116 Hunter Hall. One HP 3000 and a HP950 are dedicated to administrative uses such as producing class rolls, maintaining student records, generating fee cards, and printing class lists. In addition, this department supports administrative functions of other departments which have specialized computer needs.

Although the purpose of this office is administrative, it does offer one important function which directly supports faculty: the staff processes the grading of Opscan-type multiple choice exams.

Word Processing Center

The Word Processing Center, located in 113 Race, has facilities for electronic entry of books, journal articles, and other documents. These services are free of charge to all UTC faculty. Material is entered into the HP3000 Series 58 using Text and Document Processor (TDP) software. The Center is equipped with an HP laser printer for small documents and can access the HP 2680 laser printer located in 116 Hunter for large documents.

CHAPTER 2

THE STUDY PROCESS

On June 28, 1988, Dr. Richard Gray met with invited faculty and staff to describe the purpose of the study team. Mr. Joe Davenport of IBM also addressed the group and discussed the procedure for the study and the amount of time and work required. The provost, Dr. Sandra Packard, provided information on her perceptions of the study. Those attending the meeting were asked to inform Dr. Gray if they were interested in serving on the study team. It was anticipated that one faculty member from each college/school would serve on the study team. The number of UTC study team members was eventually set at seven; only three of these were at the original June 28 meeting. Three IBM representatives (Mr. Joe Davenport, Mr. Doxey Alston, and Ms. Sherrye Goss) assisted the study team.

UTC members of the study team received a letter from Dr. Packard confirming their appointment to the group (see Appendix A).

A flexible meeting schedule covering six weeks was adopted because of the summer semester and scheduled vacations. The study team agreed to meet on Tuesday, Wednesday, and Thursday of each week from 9:00 a.m. to 3:00 p.m.. It was agreed that the final report would be presented to the chancellor and provost in late August.

Week 1 (July 5-7): Topics for discussion were selected, and subtopics within each area were written down. Although the outlines were rough, they provided a framework for developing a questionnaire and pinpointing topics of major concern. The questionnaire was developed and distributed to selected faculty and staff during the week of July 12 (see Appendix B). Those faculty and staff who were selected represented a wide cross section of the university community. Each person to be interviewed received a personal letter from the provost as well as a copy of the instrument (see Appendices A and B). The interview schedule was established by telephoning the faculty members to ensure that they would be able to attend.

Week 2 (July 18-21): Interviews were conducted in Room 445 of the Arena. Of the 70 persons specifically invited to be interviewed, 67 faculty and staff were able to come for the interviews. A list of those interviewed and demographics on them is contained in Appendix C. There were 18 groups of faculty and staff, while the members of the study team accounted for the 19th group. Interviewees were grouped by related disciplines. Those interviewed were asked to complete the questionnaire and bring 10 copies of it with them. Three to four people were interviewed at a time with one hour designated as the time span. Between each interview, one-half hour was set aside as a time to review the remarks. During each interview one member of the study team took notes on sheets of transparency film so that the points of discussion could be displayed on an overhead projector at the conclusion of the session. These notes were later transcribed, and copies were distributed to the members of the study team.

Week 3 (July 26-28): The main issues and problems were identified and categorized into the following topics: access, consulting and training, networking and communications , faculty support, library, hardware, software, planning, and literacy. Study team members were assigned to summarize responses related to these specific areas. Drafts of these summaries were circulated, reviewed, and edited.

Week 4 (August 1-4): On August 2, 1988, the members of the study team attended a presentation at the Chattanooga IBM office. Software packages (CAD/CAM, word processors, and graphics) were demonstrated and discussed. Later in the week, the members reviewed written statements and prepared recommendations. Since many of the study team members were scheduled to be out of town, there was a one week hiatus in the meetings.

Week 5 (August 16-18): Recommendations were drafted addressing each of the areas identified in weeks 3 and 4. A timetable for implementation of the proposed solutions was developed. Transparencies for use on an overhead projector were designed to accompany the oral presentation of the report.

Week 6 (August 22-25): The implementation plan was drafted, using August 24 as the target date for completion. Persons on the study team were assigned topics to explore and discuss before that deadline. The final report was edited and published.

The study team presented its report to Associate Provost Gray on August 24 and to Provost Packard on August 25, 1988.

Research Methodology

Because the purpose of this report was to investigate feelings, thoughts, and information about academic computing from a variety of people across the University community, the study team used the approach recommended by Mr. Joe Davenport, the consultant from IBM. The study team identified the base for this approach as Glaser and Strauss' method of discovering theory as a process or, in other words, generating conclusions from the data. This method, called the discovery of grounded theory, encourages constant comparative analysis of each instance of data to that previously collected. From this process, conceptual categories are derived.

Faculty were interviewed in groups, generally of four members from the same or related disciplines--a process patterned on that of focus groups (which are usually twice as large in size). Loosely structured and versatile in nature, focus group interviews concentrate attention on a particular topic or experience. They are usually intensive interviews, allowing for an interplay of attitudes, emotions, and exchange of information. The great strength of focus groups is that they provoke discussion of greater spontaneity and candor than can be expected in an individual interview because the group members draw social strength from each other.

Once the data were collected from the individual questionnaires and by notes written during the group interviews, the study team performed a content analysis to determine the nature of the issues discussed and the persistence or frequency of these issues. A coding chart listing major and minor categories was constructed. As work progressed and data were quantified and integrated , some of the original categories were collapsed and others added.

Historical Information

In addition to the data collected in the interviewing process, two additional sources were used for historical information.

In fall 1987, the Computer Curriculum Integration (CCI) area of CECA distributed an eight page survey to all faculty. Seventy respondents completed the instrument designed to

determine how familiar faculty were with the current academic computing facilities. Another objective of this project was to find out what additional facilities were required. Appendix E contains a copy of the instrument and shows the tabular results of the statistical analysis of the data.

The second source was the 1988 Inventory of Courses, the ninth such data collection conducted since 1976. Every year each academic department is asked to submit information on which courses use computer resources, the number of students involved, and the type of software employed. Appendix F contains the 11 summary tables from the 1988 Inventory. For the sake of brevity, individual department reports were omitted from the appendix.

CHAPTER 3

SUMMARY OF QUESTIONNAIRE AND INTERVIEW RESPONSES

This chapter contains a summary of the information and comments collected during the four days of interviews. Seventy are faculty and staff were asked to complete the survey instrument and to interview with the study team. Only three people were not able to attend the interview; but those three submitted completed surveys. Two people attended the interview, but did not submit completed surveys.

After the interview process was completed, the study team was divided into two groups. One group analyzed materials from interview groups 1 through 9. The second group completed the process for the remaining 9 interview groups. Members of the study team submitted their completed questionnaires, the results of which are shown as group 19.

Appendix D (Matrix of Analysis of Responses) summarizes the information by category and subtopics. The numbers under each group indicate the number of respondents who discussed the specific subtopic. The column "Pct. Grps" indicates the percentage of groups which discussed the topic while the column "Pct. Resp" indicates the percentage of respondents who commented on the issue.

For purposes of emphasis and clarity, percentages quoted in this chapter refer to the percent of groups responding compared to the total of 19 groups. On an additional note, the categories are discussed here in *alphabetical* order, not in order of priority.

Access

A large percentage of respondents to the study team's queries expressed an immediate need for greater access to campus computing resources by both faculty and students. A significant portion (78 percent) of the groups recommended that each faculty office be equipped with a microcomputer connected to the campus network. One professor pointed out, "Every office should have a computer just the way we have file cabinets." Comments mentioned the need to have access to equipment in a more immediate setting in order to serve better some instructional as well as administrative functions. Many groups (52 percent) expressed a desire for online access from their offices to student data (including course schedules and RAP sheets) and to the university's graduate and undergraduate catalogs for purposes of advising, course planning, and curriculum management.

Several groups (63 percent) suggested that student access to campus computing resources could best be improved by providing at least one microcomputer cluster in each academic building, and 14 groups (73 percent) felt that access could be improved by extending evening and weekend hours of such clusters. Seven groups (37 percent) specifically suggested that a microcomputer cluster be located in the Lupton Library whose hours already include evenings and weekends. A few respondents suggested that microclusters be located in university dorms and/or the University Center.

Some respondents' comments suggested that existing microcomputer clusters are both too few and too small. Some suggested that clusters be located on ground floors (more accessible from the outside) and that the rooms be more inviting and more comfortable. The need for more equipment in the clusters also was mentioned frequently.

Communications/Networking

A summary of this topic shows that there is an immediate need for a campus-wide computer network to connect all faculty and staff offices, to support electronic mail (E-mail), and to promote electronic data and file transfer.

The number one requirement for this campus was networking, according to sixteen groups (84 percent). These responses indicated an awareness that this campus should rapidly develop an electronic network that interconnects all mainframes, mini, and micro computers into a campus-wide network, with access "as free as telephone access." The goal is to achieve an interconnection of each computing resource whether it is located in a computer room, a micro laboratory, or a faculty/staff office.

Discussions and a content analysis of questionnaires reveal that the need for networking is closely linked with the requirement to perform electronic mail transfer (E-mail). Seventeen groups (90 percent) reported this as a goal to be achieved rapidly. According to one interviewee, "We ought to have electronic mail as soon as possible, and it should be an extended electronic mail. We could commit most of our standard forms (i.e., class changes, incomplete removals, etc.) to the communications system along with some appropriate codes to limit unauthorized access." One dean reported that regular campus mail delivery should carry a charge for use, while E-mail should be free. Many criticized the plethora of junk mail that faculty and staff receive each day through campus channels.

Other benefits of networking mentioned by several groups include wider access to BITNET (a low-cost, world-wide higher education network) resources, the support of electronic bulletin boards and telecommunications, and less use of campus phone services with their high noise interference when used with computers. These remarks were best summed up by the participant who said, "I think we must look at a capital intensive effort to install a high speed fiber optic network by 1995. This would carry voice, data, and video to most buildings on campus. Such a network will need to be implemented system-wide, or even state-wide, so that information and faculty expertise can be used in remote areas."

It was suggested that the current HP42 (Library) be used as the campus E-mail machine when it becomes available at the time the Library shifts to the HP3000 series 58 currently being used by CECA. A concerned dissenting voice said, "As a historian I am against electronic mail. How the hell are we ever going to understand a past that puts its correspondence in an electonic bucket--and then obliterates it?"

Computer Literacy

While there is confusion about the meaning of computer literacy, there is agreement with the Southern Association of Colleges and Schools (SACS), that the computer is "an important means of both communication and computation." SACS' criteria for accreditation state that "institutions should provide basic computer instruction for their students." The University of Tennessee at Chattanooga places the acquisition of such a skill as goal #2 in its present mission statement:

> UTC will ensure that all graduating students are proficient in communication skills, mathematics skills, and critical thinking; and that they understand the role and utilization of computerized information technologies.

Computer literacy does not necessarily mean computer fluency or even competency, but those faculty who are most committed within their disciplines toward achieving this goal emphasize that students must be able to use the machine as a technological tool in their careers and professions.

The participants in the survey voiced their strongest comments (39 percent of the groups) about the need for an extensive computer program to educate all faculty. This computing-across-the-curriculum program would be similar to the three-year writing-across-the-curriculum project. Concomitantly, 5 groups (26 percent) commented on the need to offer a separate short computer course(s) to students, perhaps as a one-hour elective. Six groups (31 percent) stressed, however, that the degree of computer literacy for majors should be determined by each department.

As is so often the case, there was a distinct cautionary voice: one group warned against forced use of the computer. One participant warned, "Let's be careful that we don't label someone as 'out of sync' if they don't conform to the doctrine of computer technology."

Consulting/Training

Eighteen groups (95 percent) requested substantial improvements in hardware and software support. The need to provide staff consulting to set up and configure PCs, to answer telecommunications and printer questions, to update operating systems, and to diagnose probable causes of hardware failure was mentioned over and over with conviction and concern by the interviewees. Specifically, 11 groups (58 percent) mentioned, either in the interviews or on their questionnaires, the need for more microcomputer staff support "at multiple levels."

Additionally, 15 groups (79 percent) mentioned the unmet requirement for support in terms of more and varied short courses and seminars. Allied to this was the reported need for improved documentation, dissemination of information about computing resources, software development support, and statistical consulting.

Many comments (not counted) were made by faculty about the great number of requests for help with individual computing problems which are burdening colleagues such as Beth Craig, Eric Lane, Kit Rushing, Mike Biderman, Randy Peterson, and Stephanie Smullen. Because these individuals clearly possess expertise, they are being singled out for their responses to software and hardware questions. For staff such as Dr. Craig, the situation is demanding but reasonable. For the faculty, it is an added burden not recognized in their regular duties, EDOs, nor released time. Many of these faculty pleaded for relief, recommending that user services be allocated more staff.

In summary, there were many suggestions that UTC acquire more staff to answer the microcomputer hardware and software questions asked by both staff and faculty. In addition, respondents requested expanded training in the use of microcomputer hardware and specific software packages. Particular mention was made of the need to continue and extend mainframe and minicomputer documentation, consulting, and training in areas such as editors, statistical packages, and log on procedures.

Faculty Rewards

One of the survey questions asked was: What rewards are required to encourage faculty development of courseware and faculty incorporation of innovative computer use into instruction? This topic elicited strong concern; there were a total of 154 comments--some passionate; some enthusiastic; and many disenchanted, frustrated and even angry.

As their chief concern, 18 groups (95 percent) expressed the need for released time to identify software, master it, and then evaluate its appropriateness for the discipline. Next in order of importance (14 groups or 74 percent) was the plea for EDO recognition, particularly for the time invested in mastering this new technology. Faculty stated that the development of software should be treated with the same respect as that for publications: "The development of courseware and related materials must be fully recognized as 'publication' for retention, promotion, and tenure purposes." Monetary rewards were listed as third in importance by 14 groups (74 percent).

Faculty mentioned other ways of rewarding work in this area. These are listed in order of greatest importance: more administrative support; additional grant support, such as that awarded by CECA; greater access to sabbaticals; new equipment; travel/conference support; receipt of 100 percent of royalties for courseware; use of a faculty mentor or computer "buddy" system; UTC purchase of equipment for faculty; discrete funds for the maintenance of faculty equipment; and modification of the student evaluation form to include awareness of computer integration in the coursework. One faculty member felt that it is important to have "strong leadership in the University community that recognizes our great potential for the production of high quality educational software. We could be the best in the world."

Hardware

The concerns of faculty with respect to computing hardware elicited by this study tended to be specialized by areas with particular needs. Two topics that did prove to be common to many groups concerned output devices (printers and plotters) and state of the art equipment.

The need for additional printers and plotters was expressed by 14 groups (74 percent). This need was a combination of difficulties in getting printed output at the remote clusters (both from word processing and from jobs run on the mainframes), and a requirement for hard copies of graphic output in the sciences and engineering. Concerns about state of the art equipment were expressed by 11 groups (58 percent). These concerns were not directed towards extremely high cost items but rather centered on modern technological devices such as the video disc, CD-ROMs, and WORMs for capturing very large amounts of text and graphic material, and on a highly parallel processor. [CD-ROMs store graphics and text in the same way that music can be recorded on CD disks; Write Once Read Many (WORM) is used for archival storage in an optical format.]

Four groups (21 percent) were interested in digital scanning capability and a VMS operating system computer. Digital scanning is related to the desire to maintain records and forms electronically rather than in paper files. A necessity to use programs that require a VMS operating system is widespread in engineering and the sciences.

The problem of the aging IBM 4381 and the need to provide a growth path for larger scale mainframe computing brought requests from four groups (21 percent) for acquiring a new mainframe and from three groups (16 percent) for upgrading the current system.

Most departments at UTC have historically had very small equipment budgets, and a feeling of insecurity relative to repair requirements for microcomputers prompted four groups (21 percent) to request a campus-wide computer maintenance contract. This new dependence on micros also led to a desire for the availability of loaner equipment during servicing periods.

Finally, two groups wanted hard disk storage provided for microcomputers, presumably both in the clusters and for machines in faculty offices. Two groups requested that microcluster maintenance be improved, and one group asked for decentralized (or distributed) computing.

Instruction

There was strong support (14 groups or 74 percent) among the faculty for the development of classrooms equipped with the latest teaching technology. According to one faculty member, "We are truly behind in computer facilities in the classroom. We are in danger of lagging behind the rest of the world in new technology." The groups' consensus was that there should be several electronic classrooms on campus with a workstation at each seat. These rooms should contain tiered seating and be fully equipped with audio-visual equipment and large screen projectors.

These electronic classrooms would be equipped with a wide variety of hardware, depending upon the needs of individual departments or instructors, but would most likely include a microcomputer and equipment to project computer displays onto a large screen for group viewing. Other types of display equipment might also be required and could include hardware to project video images from either a local or remote VCR to a large screen. The final configuration of each room should be determined after consultation with appropriate faculties.

There was an extensive demand (11 groups or 58 percent) for additional classrooms containing a primary system, such as projection equipment, to allow the display of computer screens. For more sophisticated users, rooms containing videodisk players and overhead monitors would be appropriate. Telecommunication and satellite communications are other devices which should be investigated.

Disciplines such as nursing have a pressing requirement for access to videodisk and CD/ROM because individualized instruction and testing can be delivered effectively. "Losing a patient" in the process of completing a videodisk assignment on critical nursing care is traumatic to the student but not dangerous to human life.

The wish was expressed that the present micro clusters be increased to handle more students. For example, the developmental studies lab contains only 10 micros, making it difficult to use the room for classes with a usual enrollment of 20 students.

Although state-of-the-art hardware and equipment was the most persistent need for computer integration, the faculty (11 groups or 58 percent) expressed a desire for technically advanced software including CAI (computer assisted instruction) programs. However, there was some feeling that computer integration should not be forced on faculty who felt uneasy about it.

Linked to the need for electronic classrooms were subsidiary issues such as the necessity for opportunities to examine the different choices available. Thus, there were

several requests for seminars and computer festivals to expose faculty and staff to both new hardware and courseware.

One question which was raised several times was whether students should be expected to buy their own microcomputers. Although it is not critical to address this question now, it will be one that will need resolution as this technological tool becomes more extensively used.

Underlying these thoughts was the feeling that new facilities were urgently needed to support continuing computer integration. Although UTC has made good progress in this direction, technology has taken a quantum leap in the last three years. Thus, UTC needs to commit substantial additional funds if it is to provide its students with classrooms that reflect new educational trends. As one faculty member noted, "Good teachers will be better teachers using new technology."

Library

Services to Lupton Library users have been greatly expanded by the installation of computers and automated networks. The Lupton Library has already introduced an online public access catalog to replace its traditional card catalog, thereby increasing its users' search capabilities and providing remote, after-hours access via data or phone lines. Forty-two percent of the groups responding to the study team's queries felt that the Lupton Library's remote, after-hours access should be improved by adding ports to the library's computer or by increasing the number of terminals or microcomputers attached to the campus network. "The number of ports needs to be doubled at the very minimum and preferably tripled," one person pointed out.

Online bibliographic search services, which became common in the 1970s, have allowed trained searchers to manipulate remote computer databases and produce a printed copy of citations in a matter of minutes instead of the hours which are involved with a manual search of traditional printed indexes or abstracts. To date, such online bibliographic search services at UTC have required the intervention of highly trained library personnel and have transferred high telecommunications charges directly to the user. The necessity for such high telecommunication charges, as well as the total dependence upon library personnel, can be greatly reduced by the acquisition of sophisticated search software and by the incorporation of new optical technologies, such as CD-ROM. Such technologies will enable libraries, like UTC's, to acquire databases on small plastic disks searchable on-site by individuals with a microcomputer. Fifteen groups (79 percent) expressed a need for such end user search capabilities or for additional budget support for their remote database searches and the associated telecommunication costs.

Access by the Lupton Library to electronic library networks already speeds the interlibrary loan process and facilitates the sharing of limited resources between the Lupton Library and other libraries from across the nation. Currently, requests for interlibrary loans completely bypass the postal system and are transmitted between UTC and other libraries electronically. Soon libraries will be asked to incorporate even newer technologies to deliver actual documents electronically and further speed the interlibrary loan process. Respondents to the study team's queries suggested that the Lupton Library should incorporate new technologies--such as telefacsimile, digitally encoded videodisks and CD-ROM's--for better information storage and retrieval. Each of these technologies is machine-dependent and will require adequate budget resources to acquire and maintain the necessary equipment and information. The Lupton Library, like other academic libraries, will need adequate budget support for both hardware and software to ensure that it

continues to meet the information needs of its users by dutifully employing new technologies in the service of scholarship.

Policy and Organization

More than half the groups felt that there must be a separate budget line for computing. The need by departments and colleges or schools to provide maintenance, purchase software, and acquire hardware is stymied by the lack of separate funds expressly budgeted for that purpose. The current freedom of reallocating scarce operating and equipment funds to support computing is not seen as viable, due to the many pressing needs of current budgets.

A third of all groups (32 percent) reported a need for more planning. One person expressed the need clearly: "There's a tremendous paucity of long-range planning on this campus." Planning for obsolescence, planning to place micros/terminals in offices, and planning for direction and effort are currently perceived as non-existent or of low priority. In several cases, this lack of planning is aimed at departments and schools. In general, this comment on planning is aimed at the university administration. In pooling these responses, it was apparent that there was a strong view that a formal planning process should be put in place to address new and separate funding for hardware acquisitions and upgrades or replacements for hardware currently in place. "We've got to put money in the bank. There is too much cost, confusion, deterioration of staff morale, and lost opportunity to make our current 'pay as you go' philosophy work with UTC's capital funding," one participant emphasized. Thus, it is clear that a major concern which the planning process has to address is that of obsolescence.

Other suggestions mentioned with less frequency included these: giving students the opportunity for the leasing/purchasing of computers; streamlining purchases of computer resources; and creating a separate academic computing committee.

Several other issues that have policy implications were raised by two or fewer groups: selling hardware and software in the book store, coordination between academic and administrative computing, common management of voice and data communication, departmental liaisons in academic computing, rental of supercomputer time, student lab fees for computing, annual updating of the academic plan, percentage-based funding, single agency for funding, and the pursuit of corporate donors.

Public Service

An overview of this topic indicates that there are two major concerns: first, a need for greater recognition and encouragement of public service; and, second, a need for greater outreach to the community through academic computing.

There were six groups (32 percent) who proposed that the citizens of Chattanooga be given greater access to our computing facilities. For example, it was noted that a UTC public network would be useful and would be a "good image builder." Other suggested ways to accomplish greater access were to offer short courses, work with public school students, and provide summer computer camps. In the same vein, there was a proposal that UTC showcase new hardware/software to local businesses and to the community colleges.

Two groups suggested that faculty should receive encouragement, either financial or written recognition, to use computers to assist the handicapped. Several individuals described innovative approaches to helping such students.

However, three cautions were noted. First, several faculty believed that consulting should not be provided without charge. Second, in the outreach process UTC should be careful not to threaten local businesses. Third, UTC's computer resources are not sufficient to support University and community needs.

There was strong support for the idea that UTC needs to reach out to the community through the medium of computers, which students find attractive. One respondent pointed out that micros were a "recruiting tool" and a "powerful retention tool." Another faculty member emphasized that "one of the most valuable things the University could do now using the Gandalf is to establish a public information service . . . ." A third participant said that there presently is a "low public awareness" of our computing resources, suggesting that both UTC and the community would gain from an extended access.

Five groups (26 percent) expressed the desire for greater recognition or media coverage for public service, whether it involved computers or not. The implication seemed to be that, because the administration did not actively recognize this type of work, there was little incentive for faculty to pursue community service. Yet the comments described earlier indicate that UTC would achieve valuable rewards from showcasing faculty projects in the community, though one person stated that the problem is not *under* publicizing but rather that there is not enough to publicize. This statement again underlines the principle that, without encouragement or publicity, faculty are unlikely to make commitments to public service. Unlike the chicken and the egg problem, it is clear that strong activity by the colleges/schools/departments in support for public service is a necessary first step to set in motion projects which at this time are bridled by lack of motivation.

Security

Respondents to the study team's queries felt that more attention should be given to the security of the University's existing and planned computing resources, but that this need for additional security should be carefully weighed against the equally recognized need for better accessibility to those computing resources. A very large portion of the groups (95 percent) expressed the need for staff both to monitor the microcomputer clusters and to service users of those clusters. Many groups (37 percent) felt that the equipment in the microcomputer clusters should be physically attached to permanent fixtures in the rooms. A few respondents indicated that combination or keyed locks to the clusters would enhance equipment security.

Many respondents expressed concerns associated with balancing the accessibility of computer software and data with its security, with particular reference to accessing online software and databases; downloading such software and data to microcomputers; accessing student information; and providing community access to UTCs computing resources. Effective use of computer software by individuals associated with the University often requires that the University be permitted to copy and distribute the software. Such copying and distribution are generally restricted by copyright laws and would require special site licenses. Some respondents felt that such licensing agreements should be put in place so that software could be made more easily accessible to those who need it. Four groups (21 percent) suggested that file servers connected to the campus network would be the best medium for securing and distributing software.

Software

Nine groups (47 percent) requested a software review mechanism to aid faculty in selecting appropriate curricular computer software. The consensus is that there is a need to have someone in some office or a study team responsible for formally soliciting software from various sources. This entity would institute a university, departmental, or individual review of this software for appropriateness and user friendliness and make these reviews available to the academic community. Four groups (21 percent) recommended that UTC initiate clearinghouse services for software, a function that also fits well with software review.

Nine groups (47 percent) also mentioned the need for more microcomputer software packages for use in instruction. Furthermore, seven groups (37 percent) stressed that UTC should acquire site licenses for utilities such as word processing, spreadsheets, graphics presentation packages, data bases, and communications software.

Specific needs were reported for CAD/CAM, demographic mapping packages, symbolic manipulation software, UNIX operating systems, and software authoring software. The need for better mainframe software, "personalized and idiot proof," also was noted by four groups.

Standards

Twelve groups (63 percent) stated that, while UTC should allow faculty the freedom to purchase what it desires, only a reasonable number of selected configurations should be supported. A majority (15 groups or 79 percent) felt that there should not be any university-wide standardization.

Eleven groups (58 percent) felt that establishing standards should be left to the individual departments. A fairly large number of interviewees (5 groups) felt that standardization can be done at the school level. An equal number of groups felt that "standardization is of low priority and should not be done." Two groups expressed the idea that the market should be allowed to drive standards.

CHAPTER 4

RECOMMENDATIONS

Careful attention to the oral and written responses of the participants has enabled the study team not only to analyze the individual comments but also to obtain a "big picture" view of the academic computing situation at The University of Tennessee at Chattanooga. With both perspectives in mind, the study team proposes and strongly supports 31 recommendations.

Planning Mechanism

Establish a formal centralized planning process.

- Planning, making choices, and setting priorities for the expenditure of limited resources has become of utmost importance.
- A sense of common purpose is essential to any academic computing plan. A centralized structure should be developed to allow greater communication and planning among departments; this structure is urgently needed both to use existing resources and to prevent duplication of purchases. Currently, departments do not always share relevant information with each other.
- As part of the planning process, a separate academic computing committee should be set up to establish goals , to maintain a strategic computing plan, and to oversee major computing purchases.
- The process should address new and separate funding for hardware acquisitions and provide for upgrades and/or replacements. While planning for future microcomputer or mainframes purchases is an important tangible concern, this must be partnered with planning directions and goals.

Budget Mechanism

Establish a separate budget line for shared academic computing resources, including hardware and software.

- Total academic computing hardware accumulates to over $2,000,000 when newly purchased at UTC educational rates. A budget line that allows for replacement (not expansion) on a five-year cycle would call for $400,000 each year and every year. To stay current with technology successfully will require additional expenditures. Not to fund at that level will mean scaling back either mainframe/minicomputers or microcomputers in instruction and research. That situation would result in a decrease in the quality of the "status quo" which would not be reasonable for UTC to advocate in light of computing developments at other universities.
- This mechanism provides a planned acquisition procedure for research and instructional software and hardware common to several areas and for a banking system to allow periodic upgrading and replacement of the major mainframes.
- Departments must accept responsibility for purchasing specialized resources and should be funded appropriately.

Establish a separate budget line for the Lupton Library computing resources, including hardware and software.

- Services to UTC library users have been greatly expanded by the use of computers and automated networks. Libraries are in transition from manual to electronic systems. Changes already brought about by advances in technology have been so extensive that it is difficult to assess their total effect, but it is clear that libraries are in a period of fundamental transformation. Libraries are being reinvented in an electronic environment and will require appropriate budget support, specifically for computing, to succeed in this environment.

Plan for obsolescence of academic and Library hardware systems.

- Typically a computer system, whether it be a mainframe or a microcomputer, has a life span of four to five years. UTC has not yet planned for the depreciation problem associated with computer hardware.

- The Lupton Library computer was installed six years ago. Because of expansion of new systems on this computer, it has reached capacity. However, no funds for CPU replacement or upgrade have been provided. The Lupton Library will be upgraded to a Series 58 in a few months. Most similar libraries are utilizing a Series 70, which is more than four times as powerful as the 58. Hence, the Lupton Library computer upgrade will still leave it behind with regards to power needed to service the campus community.

- The University should designate a line of funding for replacing obsolete equipment; this amount should be shown in a separate funding line in the budget.

Acquire new technology items to support both teaching and a variety of research.

- One mechanism that needs to be improved is providing budgets for departments to procure hardware in areas where this has not been traditional, such as in education and business. Where there are common requirements for equipment that spans the need of several departments or where the need is for periodic supply of very expensive items, Academic Computing should provide the facilities, drawing from a regular yearly budget for such acquisitions.

- Examples of the types of technology which span several departments are video disk technology and related hardware for capturing very large blocks of data in high speed access memory.

Balance funding between microcomputers and mainframes.

- A balanced view must be taken with regard to funding microcomputers and mainframes. Experts agree that microcomputers, while satisfying important computing needs, will never replace mainframes. On the other hand, the campus needs for microcomputer facilities and support are clearly growing rapidly.

Faculty Support and Training

User services should be enhanced and enlarged.

- Personnel must be added to deliver more support, both broad based as well as specialized in nature, for hardware and software usage.
- Specialists, such as one for mathematics/science or one for business administration, should be hired to support these specialized areas.
- Additional resources and personnel should be designated to assist faculty who want to learn or use word processing and desktop publishing applications. Many faculty see the need to develop skills in this area, particularly since Graphic Services has a new typesetter capable of converting disk input to camera-ready copy.
- The University should hire a technical support person responsible for microcomputer maintenance and repairs of a minor nature.

Establish a hot-line, staffed by a skilled person, to screen calls and direct the caller to the right trouble-shooter.

- Creation of a hot-line would help eliminate the present confusion among the UTC community as to which person to call for assistance.
- The results of putting the hot-line into operation would be beneficial to both administrative and academic computing.
- The recommendation includes creation of a database to allow the hot-line person to look up information on a video display.

Review, acquire, and publicize appropriate microcomputer software.

- The large quantity of educational material, much of it of limited value, makes it difficult for faculty to determine the best purchases for their department.
- By reviewing and evaluating software, standard programs can be selected which will be multi-disciplinary in use.

Prepare a selected list of hardware and software that will be supported by Academic Computing.

- The list should be prepared in consultation with the various academic units.
- This list should be publicized at regular intervals. However, faculty should have the liberty to purchase what they desire, even though the software and hardware may not be supported.

Make documentation for computer hardware/software more widely available.

- Funds should be designated for purchasing manuals, etc., for distribution to major user areas.
- CD-ROM technology should be explored as a medium for accessing and distributing documentation.

Networking/Communication

Extend campus network to all UTC buildings, including dormatories.

- Enlarging the campus network involves 1) extending the Gandalf connections to all buildings with reasonable access; 2) installing optical fiber connections to all buildings in a phased development; and 3) installing local area networks (LANs) in every area with contiguous microcomputer software needs.
- Eventually the Ethernet will need to be replaced with a very high rate transmission path conforming to the Fiber Distributed Data Interchange (FDDI) standard to provide near-transparent connection of all facilities on campus (and to UTK).
- It is important to purchase electronic file servers for the LANs and to gate these to the campus network. File servers with local mass storage offer the most economical and secure means of providing local software and data storage capacity to students and faculty. In addition, file servers discourage software piracy and are the best medium for distributing standard software.

Faculty Access to Microcomputer Systems

Equip each faculty office with an appropriately configured microcomputer workstation connected to the campus network.

- This recommendation, if implemented, would provide each faculty member with both microcomputing capabilities and mainframe access in an immediate setting to facilitate instructional as well as administrative functions. This recommendation will require the appropriation of major financial resources and should, therefore, be viewed as a long-term university goal requiring phased implementation.
- Each college/school or department should help determine the appropriate microcomputer configuration for its faculty offices. Some peripheral equipment, such as letter-quality printers and plotters, may be shared among faculty members in the same academic area.
- No faculty member should be forced to use such a workstation.

Establish E-mail system for faculty and staff.

- Initiate an E-mail system for use by faculty and staff as a priority goal. Use the critical mass of users concept both in top/down structure and where there are concentrations of terminals or PCs attached to the network.

- This recommendation includes developing an electronic bulletin board for the UTC community.

Provide specialized workstations with graphics capabilities and access to printers, plotters and digital scanners.

- Faculty and students require workstations which would permit UTC graduates to receive the state-of-the-art training needed for entry to the competitive job market.

- A spectrum of workstations is required for optimum use of the power and graphics capabilities of these devices, ranging from some of medium resolution and moderate computing speed up to a few with very high resolution and high speed. Similarly, a few scanners should be of the very high resolution category, with most of normal resolution.

Curriculum Integration

Establish electronic classrooms and incorporate new technologies into the curriculum.

- Each academic building should be equipped with at least one electronic classroom.

Purchase the appropriate site licenses so that software can be made more easily accessible to those who need it.

- Acquisition of site licenses eliminates the need to purchase individual copies of software programs, solves the problem with copyright protection, and extends access to multiple users.

Create an extensive faculty program addressing the use of computers in the classroom; such a program would parallel the former "writing across the curriculum."

- In the initial stages of the "writing" process, faculty were provided with extensive instruction. "Computing across the curriculum" would promote the use of computers in the same way that the other program encouraged writing.

Offer courses to enable students to become computer literate.

- The study team strongly supports the immediate establishment of such courses to offset the inevitable demand for this computer literacy by accrediting agencies. These courses should initially be offered on an elective basis; then after evaluation and refinement the courses should be mandatory.

Distributed Microcomputer Clusters

Provide at least one microcomputer cluster in each academic building.

- This process would distribute computing better across the campus and would permit computer-based instruction to occur in areas close to distinct instructional divisions.
- Each cluster should be equipped with an adequate number of workstations which are networked and connected to the campus network as appropriate.
- Appropriate clusters need to be staffed with competent personnel to assist users with hardware and software and to provide security.
- Clusters need to be housed in areas which have sufficient space (a problem) and are accessible but also secure.
- At least one major cluster (possibly in the Lupton Library) should be open and staffed during evening and weekend hours.
- Appropriate microcomputer and peripheral configurations for each cluster should be developed in partnership with the academic departments in that building.
- The hardware in each cluster should be secured with lock-down devices. Other security measures such as push-button locks and human or electronic monitors (as appropriate to the equipment and location) should be provided.

Examine the hard copy output capability at remote clusters and procure additional printing and plotting devices to make these clusters more efficient.

- Remote printing destinations for mainframe jobs are necessary.
- Better quality and/or laser printers for high intensity word processing locations are also essential.
- Hard copy plotting capability needs to be provided at graphics locations.
- As clusters and groups of microprocessors are added, adequate and suitable hard copy output capabilities will need to be provided.

Expand the capacity of some microcomputer clusters to handle a class of up to 30, providing each student with a computer.

- These clusters could be reserved as classrooms but used for individual work at other times.
- Some electronic classrooms may also play this role.
- It is important to keep most clusters free from reserved use; classes interfere with the normal work flow in ordinary microcomputer clusters.

Upgrade/Replace Hardware

Replace the aging IBM 4381 mainframe.

- The IBM 4381 mainframe has a very limited upgrade path and within one or two years will not be capable of handling the heavy numerical processing tasks which are beginning to dominate its load. A replacement machine with extensive upgrade possibilities is recommended.

- A wise strategy to achieve the best performance per dollar is to selectively purchase used hardware or hardware whose price has dropped. While this strategy means the mainframe will not be at the leading edge of the technology, it will offer much greater cost effectiveness.

- Funds will need to be banked annually to provide this replacement and subsequent upgrades.

- A budgeting strategy which is flexible enough to accommodate unexpected changes to the technology must be maintained.

Maintain capacity to run major operating systems for collegiate and scientific software.

- To replace the VMS operating system machine at the end of its useful life in three to four years, funds must be banked now.

- It is vital to bank funds to replace the other major academic mainframes when they become obsolete in five or six years.

- UTC needs to purchase a site license for a UNIX operating system for one of the mainframe systems and to investigate the role of this system in the campus network.

Faculty Rewards

Institute both a tangible and non-tangible reward system .

- While many individuals want a monetary reward, others feel that recognition is an unmet need. Still others express the desire for released time. Concurrent with the matter of compensation was the strongly expressed need for a more responsive system than the present EDO process.

- This recommendation may involve revision of the EDO system so that it does indeed significantly recognize and reward merit.

Provide strong recognition to faculty who develop new courseware or find innovative ways to use software.

- In recognition of the extensive amount of time and preparation required to design a computer program, the creation and publication of software should be equated with publishing a book and rewarded with commensurate compensation.

- The time required to master new software and include it in the curriculum needs to be recognized, possibly by appropriate awards of released time.

Provide stronger recognition, both within and outside the University, to those individuals who devote time and their computer skills to public service.

- Sharing one's computer expertise is a highly valued professional activity that can be recognized at such events as Faculty Honors Day, by prominent attention in local newspapers, by articles in publications such as "The Torchbearer" and "UTC Today," and through segments in video-presentations such as those given annually to the board of trustees.

- Without this recognition, it is unlikely that faculty will undertake public service. Yet such activity is necessary to bond town and gown.

Policy

Streamline purchase procedures.

- Procedures are required to prevent legal or procedural difficulties (such as contract revisions) for acquiring high quality, inexpensive software developed by small companies who are not willing to modify purchase contract clauses.

- These procedures should shorten the time between submission of the purchase order and the delivery of the equipment, a critical problem in incorporating computer technology into the curriculum.

Establish software standards for word processing and spreadsheets in the administrative areas. All other standards should be left to the individual departments to establish.

- This recommendation would facilitate staff training.

- Standardization would ease the problem of consultation facilities and reduce the need for documentation.

- Transfer of information and data would be expedited between campus units if there were campus-wide standards.

Develop a course for an "electronic" secretary.

- Those secretaries completing the course should receive recognition and a monetary reward but would be expected to serve as mentors for subsequent participants.

Make academic computing facilities more available to the Chattanooga community.

- An outreach to local groups would establish a good relationship and increase knowledge of UTC's computing resources.

CHAPTER 5

IMPLEMENTATION PLAN

The information gathered from interviewees (Chapter 3) and the recommendations drawn from data (Chapter 4) are the framework for the implementation plan contained in this chapter. The study team decided that the most efficient method of presenting the implementation was to use a matrix format. The plan is a long-range one (five years) starting with FY 1988-89.

Table 5.1 indicates the timeframe for each of the recommendations in Chapter 4. For ease of comparison, the items are presented in the same order as the recommendations.

Table 5.2 is a matrix indicating the projected costs for implementing the five year plan discussed in Table 5.1. Costs have been omitted from recommendations where such costs are expected to be minimal.

Table 5.3 includes information on a projected network timetable, the current microcomputer cluster configuration, and the projected number of clusters.

Overview of Tables 5.1 and 5.2

On a priority basis, the strongest recommendation is for centralized, formal planning (see Planning Mechanism). Closely related to this is the necessity for separate budget lines to designate funds for new hardware and to address obsolence (see Budget Mechanism). The study team determined that there is an urgent requirement for additional consulting and training personnel (see Faculty Support and Training).

With regard to equipment, each faculty office needs to be equipped with a microcomputer and to be connected to a network (see Networking Communication and Faculty Access to Microcomputer Systems).

Other areas included in the implementation framework are: microcomputer clusters in each building, site licenses, and scheduled replacement of major hardware and microcomputers. Another topic which should be addressed is faculty rewards either in the form of money, released time, or courseware purchases. Other items that would support the long range plan are streamlining of purchases, setting software standards, and establishing a schedule to train UTC secretaries to fully use microcomputers.

Notes Pertaining to Table 5.2

General comments applicable to the tables are:

1. No inflation or time values-of-money is built into the budget.

2. Salary budgets include estimated fringe benefits.

Budget Mechanism

Library computing budget basis--
Added equipment and services such as terminals; CD ROMs; data bases for HP3000, PCs, and CD ROM players; and software

Acquisition of new technology--
Annual cost estimate for procuring hardware items in this category

Faculty Support/Training

Enlarged user services--
Software specialist already budgeted 1988
Add one new specialist in FY 1989-90
Add second new specialist in FY 1990-91

Hot-line--
Add a staff person in FY 1989-90

Acquisition of micro software
An addition to current budget for micro software

Documentation--
Ongoing costs of procuring documentation and related hardware (ROM access)

Networking/Communications

Extension of network -- See schedule in Table 5.3, cost of materials, labor and switching hardware.

E-mail -- Software and management costs.

Faculty Access to Micro Systems

Micro in every office -- Purchase approximately 50 microcomputer workstations each year, with a range of capabilities such that basic level users (probably the majority of new users) receive a vanilla machine and "power" users receive a more sophisticated work station. This process includes a mechanism for handing down machines as the needs of users becom e more demanding to delay obsolescence of the machines we own.

Work stations, plotters, scanners -- Purchase four workstations per year with a variety of special printers, etc. Purchase printers and scanners as indicated.

Curriculum Integration

Electronic classrooms -- In Year 2 establish a classroom completely equipped with file servers, overhead projection, scanners, etc. at a cost of $45,000. Also that year establish a classroom with projection equipment and microcomputers at a cost of $15,000. Years 3 thru 5, establish two modest electronic classrooms each year for a total of $24,000 each year.

Site licenses/volume purchase -- Estimated annual costs of providing site licenses for software with significant common applications.

Distributed Microcomputer Clusters

Microcluster in every building -- Estimated cost of adding two major micro clusters each year with capabilities tailored to the needs of the local academic areas.

Hardcopy services -- Provide remote printing capabilities for the mainframe computers at major existing clusters.

Upgrading of labs to 25 - 30 units -- Add microcomputers to selected clusters to bring them up to classroom size.

Upgrade/Replace Hardware

Replacement of IBM mainframe -- 3090 or better -- purchased on the used market at 50% of list or using extraordinary ACIS discount of 40% or better.

VMS -- Purchase of DEC VMS 8300 or better at discount of 33% or purchase of used system at greater discount.

HP 950 replacement in Year 6 requires that during the plan's life the banking of 4/5 or 80% of replacement costs. Assumption is a high discount of 33% or more.

Mac's -- Currently there are 100 Macs on campus. This plan calls for replacement of 20 per year. Those Macintoshes replaced will be moved to UTC users currently without Macs who can benefit from whatever useful life remains in these technologically obsolete, but still usable, machines.

IBM PC's -- Currently there are 100 IBM PCs on campus. This plan calls for replacement of 20 per year. Those PCs replaced will be moved to UTC users currently without them who can benefit from whatever useful life remains in these technologically obsolete, but still usable, machines.

Terminals -- straight obsolescence; still most economical choice.

Purchase of UNIX -- This operating system is instructionally important and may be central to the campus network developments.

Purchase of library computer -- An HP Series 925, or larger, with larger and newer disk drives will be needed at about a 33% discount.

Faculty Rewards

Faculty reward system -- Augment the grant program restricted to instructional applications of computers.

New courseware -- Augment software procurements specifically for development of courses as well as educational courseware

TABLE 5.1

TIME FRAME FOR ACADEMIC COMPUTING PLAN

Topic	Year 1	Year 2	Year 3	Year 4	Year 5	Person Responsible
Planning Mechanism						
Planning Process	Establish	Continue	Continue	Continue	Continue	Provost
Budget Mechanism						
Academic Computing Budget	Develop	Initiate	Continue	Continue	Continue	Chancellor
Library Computing Budget	Develop	Initiate	Continue	Continue	Continue	Chancellor
Budget for Obsolescence	Develop	Develop	Initiate	Continue	Continue	Chancellor
Acquisition of New Technology	Initiate	Continue	Continue	Continue	Continue	AP Budget, Personnel
Balanced Computer funding	Initiate	Continue	Continue	Continue	Continue	AP Budget, Personnel
Faculty Support/Training						
Enlarged User Services	Initiate	Continue	Continue	Continue	Continue	CECA Director
	Add new position	Add new position	Add new position			
Hot-line	Develop/Initiate	Continue	Continue	Continue	Continue	AP Budget, Personnel
	Add new position	Add new position				
Review/Purchase of Software	Develop	Develop	Continue	Continue	Continue	CECA Director
Hardware Standards	Initiate	Update	Update	Update	Update	CECA Director
Documentation	Develop	Initiate	Update	Update	Update	CECA Director
Networking/Communication						
Extension of Network	Start LAN	Add 2 Bldgs.	Add 2 Bldgs.	Add 2 Bldgs.	Add 2 Bldgs.	AP Budget, Personnel
		Add new position		Add new position		
		2 LANs	2 LANs	2 LANs	2 LANs	
E-mail	Develop	Initiate	Continue	Continue	Continue	AP Budget, Personnel
Faculty Access to Microcomputer Systems						
Micro Every Office	Develop Plan	50 micros	50 micros	50 micros	Cycle/Replace Obsolete	Chancellor
Work Stations, etc.	Develop Plan	4 workstations	4 workstations	4 workstations	4 workstations	AP Budget, Personnel
Special Printers, etc.		2 printers	2 printers	2 printers	2 printers	
		2 scanners	2 scanners	2 scanners	2 scanners	
Curriculum Integration						
Electronic Classrooms	Develop	Establish 2	Establish 2	Establish 2	Establish 2	
Site License	Initiate	Expand	Continue	Continue	Continue	Provost
Computing Across Curriculum	Plan	Initiate	Continue	Evaluate	Done	CECA Director
Courses for Students	Std;. Feasibility	Charge Fac. Council				Provost
						Faculty Council

Topic	Year 1	Year 2	Year 3	Year 4	Year 5	Person Resonsible
Distributed Micro Clusters						
Micro Cluster in Every Bldg.	Develop	Add 2	Add 2	Add 2	Add 2	AP Budget, Personnel
Hardcopy	Upgrade	Improve	Done			
Upgrade of Labs to 25-30 units	Upgrade	Add 1 Lab	Add 1 Lab	Add 1 Lab	Done	
Upgrade/Replace Mainframe						
Replacement of IBM Mainframe	Designate funds	Plan and	Replace Mainframe	Designate funds	Designate funds	AP Budget, Personnel
		Designate funds	Designate funds			
Replacement of VMS Mainframe	Designate funds	Designate funds	Designate funds	Designate funds	Designate funds	AP Budget, Personnel
				Replace mainframe		
Replacement HP 950 Mainframe	Designate funds	Designate funds	Designate funds	Designate funds	Designate funds	AP Budget, Personnel
					Replace Year 6	
Replacement of Micros (Mac)	Replace	Replace	Replace	Replace	Replace	AP Budget, Personnel
Replacement of IBM PCs	Replace	Replace	Replace	Replace	Replace	AP Budget, Personnel
Replacement of Terminals	Replace	Replace	Replace	Replace	Replace	AP Budget, Personnel
Purchase of Unix	Purchase site	Designate funds	Designate funds	Designate funds	Designate funds	AP Budget, Personnel
	license					
						AP Budget, Personnel
Faculty Rewards						
Faculty Reward	Study	Augment	Continue	Evaluate	Continue	Provost
New Courseware	Implement	Continue	Continue	Continue	Continue	Provost
Public Services	Implement	Continue	Continue	Continue	Continue	Provost
Policy						
Streamlining of Purchases	Implement	Continue	Continue	Continue	Continue	AP Finance
Software Standards	Implement	Continue	Continue	Continue	Continue	Provost
Electronic Secretary	Plan	Implement	Continue	Evaluate	Continue	Provost/AP Finance
Public Service - Chattanooga	Plan	Implement	Evaluate	Continue	Continue	AP Finance

Table 5.1 (cont'd)

TABLE 5.2

PROJECTED COSTS FOR ACADEMIC COMPUTING PLAN

Topic	FY 88-89 Year 1	FY 89-90 Year 2	FY 90-91 Year 3	FY 91-92 Year 4	FY 92-93 Year 5	Five Year Costs
Planning Mechanism						
Planning Process						
Budget Mechanism						
Academic Computing Budget	(see Total Line)					
Library Computing Budget		15,000	15,000	15,000	15,000	60,000
Budget for Obsolesence	(see Upgrade/Replace Hardware line)			0		0
Acquisition of New Technology		30,000	30,000	30,000	30,000	120,000
Balanced Computer Funding	(see Upgrade/Replace Hardware line)					
Faculty Support/Training						
Enlarged User Services		35,000	70,000	70,000	70,000	245,000
Hot-line		20,000	20,000	20,000	20,000	80,000
Review/Acquisition of Micro Software		5,000	7,000	9,000	11,000	32,000
Hardware Standards						
Documentation	2,000	2,000	2,000	2,000	2,000	10,000
Networking/Communication						
Extension of Network to UTC Bldgs.		20,000	20,000	20,000	20,000	80,000
Personnel for Network Support		20,000	20,000	40,000	40,000	120,000
E-mail	5,000	10,000	10,000	10,000	10,000	45,000
Faculty Access to Micro Systems						
Micro Every Office		150,000	150,000	150,000	150,000	600,000
Work Stations, etc.		72,000	72,000	72,000	72,000	288,000
Special Printers, etc.						
Printers		7,000	7,000	7,000	7,000	28,000
Scanners		4,000	4,000	4,000	4,000	16,000
Curriculum Integration						
Electronic Classrooms		60,000	24,000	24,000	24,000	132,000
Site License/Vol. Purchase		15,000	15,000	15,000	15,000	60,000
Computing Across Curriculum						
Courses for Students						

Topic	FY 88-89 Year 1	FY 89-90 Year 2	FY 90-91 Year 3	FY 91-92 Year 4	FY 92-93 Year 5	Five Year Costs
Distributed Microcomputer Clusters						
Micro Cluster in Every Bldg.		90,000	90,000	90,000	90,000	360,000
Hardcopy Devices	5,000	5,000	5,000			15,000
Upgrading of Labs to 25-30 units		20,000	20,000	20,000		60,000
Upgrade/Replace Hardware						
Replacement of IBM Mainframe			900,000			900,000
Replacement of VMS Mainframe				300,000		300,000
Replacement of HP 950 Mainframe					*240,000	240,000
Replacement of Micros (Mac)	35,000	35,000	35,000	35,000	35,000	175,000
Replacement of IBM PCs	40,000	40,000	40,000	40,000	40,000	200,000
Replacement of Terminals	20,000	20,000	20,000	20,000	20,000	100,000
Purchase of Unix		10,000				10,000
Purchase of Library Computer				300,000		300,000
Faculty Rewards						
Faculty Reward System		50,000	50,000	50,000	50,000	200,000
New Courseware	2,000	4,000	4,000	4,000	4,000	18,000
Public Services						
Policy						
Streamlining of Purchases						
Software Standards						
Electronic Secretary						
Public Service - Chattanooga						
Total Costs	109,000	739,000	1,630,000	1,347,000	969,000	4,794,000
* Banking for replacement in Year 6						

Table 5.2 (cont'd)

TABLE 5.3

BUILDINGS REQUIRING LAN NETWORK	
Building	Proposed Installation Date
Fletcher	FY 1988-89
Library	FY 1988-89
Brock	FY 1989-90
Fine Arts	FY 1989-90
Guerry	FY 1990-91
Bretske	FY 1990-91
University Center	FY 1991-92
Frist	FY 1991-92
Dorms	FY 1992-93

CURRENT MICROCOMPUTER CLUSTERS
Grote 3
Guerry
Fletcher
Frist
Hunter
Race

MICROCOMPUTER CLUSTERS REQUIRED
Holt
Brock
Math
Library
University Center
Arena
Dorms
New Building

APPENDICES

APPENDICES

APPENDIX A - Correspondence
- Dr. Packard's Letter to the Study Team
- Dr. Packard's Letter to All Faculty
- Dr. Packard's Letter to Selected Faculty

APPENDIX B - Survey Instrument

APPENDIX C - List of Interviewees
- Demographics of Interviewees

APPENDIX D - Matrix of Analysis of Responses

APPENDIX E - Computer Curriculum Integration (CCI) Survey (1987)

APPENDIX F - Excerpts from 1988 Inventory of Courses

APPENDIX G - Hours of Operation of Computing Facilities

APPENDIX H - Information on the Members of the Study Team

APPENDIX A

CORRESPONDENCE

THE UNIVERSITY OF TENNESSEE
AT CHATTANOOGA

Office of the Provost
102 Founders Hall
615 McCallie Avenue
Chattanooga, TN 37403
(615) 755-4633

M E M O R A N D U M

TO: Dr. Deborah Arfken, Human Services
Dr. Terrance Carney, Engineering
Dr. Elisabeth Craig, Academic Computing Services ✓
Dr. Lloyd Davis, Education
Dr. Parthasarati Dileepan, Management
Dr. Edward Rozema, Mathematics
Mr. Randolph Whitson, Library

FROM: Sandra Packard sandy

SUBJECT: Academic Computing Needs Assessment

DATE: July 1, 1988

With this communication I am initiating a study to assess the university's academic computing capabilities and needs. This will be an intensive planning effort covering a period of approximately six weeks, beginning on July 5, 1988. The study is scheduled to culminate with the submittal of a formal report and the presentation of study findings during the week of August 8th. A tentative activity schedule is attached.

Mr. Joe Davenport, an IBM consultant for colleges and universities, will guide the planning process for the study team. Dr. Terrance Carney, Professor and Director of Electrical Engineering and Computer Applications in the School of Engineering, has agreed to serve as the Study Team Leader.

I appreciate your willingness to serve in this very important capacity. The results of your labors will significantly benefit the entire university. I look forward to receiving your recommendations.

Attachment

xc: Frederick Obear
Joe Davenport
Sherrye Goss
Richard Gray

RCG/gg 7-1-88

THE UNIVERSITY OF TENNESSEE
AT CHATTANOOGA

Office of the Provost
102 Founders Hall
615 McCallie Avenue
Chattanooga, TN 37403
(615) 755-4633

MEMORANDUM

TO: UTC Family

FROM: Sandra Packard, Provost

SUBJECT: Long Range Planning for Academic Computing at UTC

DATE: July 15, 1988

A strategic plan for the development of Academic Computing at UTC over the next three to five years is being formulated by a strategic planning task force this summer. One of the key ingredients of this study is a series of interviews of UTC faculty and some administrative personnel to take place during the week of July 18th to the 21st. While we cannot interview all the faculty, we invite those not included in this process to make their needs and views known, either to faculty to be interviewed or to members of the task force. The enclosure provides names of those to be interviewed as well as members of the task force.

We appreciate your contribution to this planning process.

jd/7-15

Attachment

xc: Dr. Frederick Obear
Dr. Richard Gray
Dr. Jane Harbaugh
Deans Council

STRATEGIC PLANNING TASK FORCE

Faculty and Staff Interviewed

July 18	July 19	July 20	July 21
9:00-10:00	**9:00-10:00**	**9:00-10:00**	**9:00-10:00**
Chopra, Prem	Kell, Jeff	Herron, Arlie	Lane, Eric
Jones, Byron	Pringle, Peter	Gavin, Tom	Tinkler, Mary
Cunningham, Jim	Printz, Jan	Thomason, Virgil	Raiszadeh, Farhad
	Rushing, Kit	Chitty, Kay	
		Tanner, Mary	
10:30-11:30	**10:30-11:30**	**10:30-11:30**	**10:30-11:30**
Peterson, Randy	Thompson, Jack	Fulton, Bob	Thompson, Roger
Pauley, Pat	Brodsky, David	Ezell, Gene	Perfetti, Pat
Pratt, Leila	Smullen, Stephanie	Ward, Jim	Walker, Grayson
	Smullen, Clint		
1:00-2:00	**1:00-2:00**	**1:00-2:00**	**1:00-2:00**
Wiley, David	Miller, Ted	Reid, Irv	Kirby-Miller, Kitty
Wallace, Bruce	Stinnett, Roy	Jackson, Joe	Quarles, Dan
Beasley, Paul	Whitaker, Colbert	Haynes, Paula	Packard, Sandra
Gerschefski, Peter	Benson, Bernie	Evans, Mary	Moser, Ralph
2:30-3:30	**2:30-3:30**	**2:30-3:30**	**2:30-3:30**
McNeely, Bob	Ford, Ann	Jayne, John	Gray, Richard
Trimpey, John	Gurley, Bill	Fox, Ray	Ernst, Marvin
Kutz, Doug	Day, Chic	Kuhn, Steve	
	Noe,Marcia		
	Hiestand, Jim		
4:00-5:00		**4:00-5:00**	
Hall, Lew		Biderman, Mike	
Meyer, Mike		Burhenn, Herb	
Anderson, Dave		Ozbeck, Nikki	
		Honerkamp, Nick	

UTC Members of Study Team: Terry Carney (Chairman), Deborah Arfken, Beth Craig, Lloyd Davis, Parthasarati Dileepan, Ed Rozema, Randy Whitson

THE UNIVERSITY OF TENNESSEE
AT CHATTANOOGA

Office of the Provost
102 Founders Hall
615 McCallie Avenue
Chattanooga, TN 37403
(615) 755-4633

July 13, 1988

TO: Dr. John Smith

FROM: Dr. Sandra Packard, Provost

RE: Academic Computing Survey

This memorandum is to confirm your participation in the Academic Computing Strategic Planning Group Study. We are developing a strategic plan for UTC Academic Computing and your input is vital. Please complete the attached questionnaire, prepare ten copies, and bring them with you to the interview.

You are scheduled to be interviewed **Thursday, July 21st, from 9:00 to 10:00 p.m.** in Room 445, the Arena.

Please call Peggy Tucker at 4396 if you have any questions.

APPENDIX B

SURVEY INSTRUMENT

APPENDIX B

SURVEY FOR THE ACADEMIC COMPUTING STRATEGIC PLANNING GROUP

This survey is intended to develop a picture of the long term needs for computing at UTC. It will be used to help construct a 3 - 5 year strategy for the computer area. Answer the questions both in the light of your needs and the needs of colleagues in your discipline and of your students. Please use additional sheets to answer these questions.

1. Please provide the following demographic information:

   a) Self-rating - Are you a heavy, average, occassional or non-user of computers?

   b) Do you own a personal computer? If so, what type?

   c) How long have you used computers?

   d) What is your academic unit?

2. What long term changes would you make to improve access to mainframe computers and/or micro clusters? What additional types of computer access to the library would be most helpful?

3. What computer resource improvements and additions (hardware, peripherals, software) are critical for:

   a) Your research?

   b) Classroom teaching?

4. What types and levels of training and troubleshooting should be provided to faculty and staff by the UTC computer staff?

5. What would you consider to be appropriate university standards for the purchase of software and hardware (particularly PC)? If appropriate, at what level should standardization occur? Department? College/School? University?

6. What should our policies and procedures be on acquiring, maintaining and replacing hardware and software?

7. What should be the campus objectives for electronic telecommunications including electronic mail?

8. How can new technologies such as CD-ROM, Videodisc and Hyper Text be identified and incorporated into the curriculum?

9. How can computer usage be best integrated into the curriculum across the campus?

10. What rewards are required to encourage faculty development of courseware and faculty incorporation of innovative computer use into instruction?

11. What public services involving the computer are on-going but under-publicized at UTC? What are appropriate directions for future computer-based public service efforts?

12. In order to maximize available hours of access, what are appropriate security arrangements for our micro computer labs, clusters, and their software?

13. What single change in your computing environment would most encourage your productivity?

14. What other comments would you like to make on the academic computing system at UTC and/or on a 3 - 5 year computer development strategy?

APPENDIX C

LIST OF INTERVIEWEES
DEMOGRAPHICS OF INTERVIEWEES

APPENDIX C

LIST OF INTERVIEWEES AND RESPONDENTS

David Anderson	Geography/Geosciences
Deborah Arfken	Human Services
Paul Beasley	Special Services
Bernard W. Benson	Curriculum and Instruction
Michael D. Biderman	Psychology
David M. Brodsky	Political Science
Herbert Burhenn	Philosophy and Religion
Terrance Carney	Engineering
Kay Chitty	Nursing .
Prem Chopra	Engineering
Elisabeth Craig	CECA
James Cunningham	Engineering
Lloyd Davis	Educational Administration and Supervision
Chick Day	Computer Science
Parthasarati Dileepan	Management
Marvin Ernst	Graduate Studies
Mary Evans	Library
O. Eugene Ezell	Health, Physical Ed. and Recreation
Ann Ford	CECA
Ray P. Fox	Admission and Records
Robert C. Fulton	English and Humanities
Tom Gavin	Accounting and Finance
Peter Gerschefski	Music
Richard Gray	Budget, Personnel & Info. Mgmt.
Bill Gurley	Engineering
Lew Hall	CECA
Paula J. Haynes	Marketing and Business Law
Arlie E. Herron	English
James Hiestand	Engineering
Nick Honerkamp	Sociology/Anthropology
Joseph A. Jackson	Library
John W. Jayne	Mathematics
Byron Jones	Engineering
Jeff Kell	Administrative Computing
Kitty Kirby-Miller	Continuing Education
Stephen W. Kuhn	Mathematics
Douglas H. Kutz	Chemistry
Eric T. Lane	Physics and Astronomy
Robert L. McNeely	Chemistry and Arts & Sciences
Mike Meyer	CECA
Ted Miller	Special Education
Ralph W. Moser	Budget and Finance
Marcia A. Noe	English
Irene Nichols Ozbek	Psychology
Sandra Packard	Provost
Patricia Pauley	Accounting and Finance
Patricia A. Perfetti	Geosciences/Environmental Studies/Physics
Randolph Peterson	Physics and Astronomy
Leila J. Pratt	Economics

Peter Pringle	Communications
Jan Printz	Human Services
Dan Quarles	UTK/UTC Graduate Center
Farhad Raiszadeh	Management
Irvin Reid	Business Administration
Edward Rozema	Mathematics
S. Kittrell Rushing	Communications
Clinton Smullen	Computer Science
Stephanie Smullen	Computer Science
Roy Stinnett	Education
Mary Tanner	Human Ecology
Jack Thompson	Computer Science
Roger Thompson	Criminal Justice
Virgil Thomason	Engineering
Mary Tinkler	Academic Athletics
John E. Trimpey	Humanities
Grayson Walker	Health and Human Services
Bruce Wallace	Art
James A. Ward	History
Colbert Whitaker	Educational Admin. and Supervision
Randall Whitson	Library
David W. Wiley	Theatre and Speech

DISTRIBUTION OF INTERVIEWEES BY ACADEMIC UNIT

School of Arts and Sciences	
Art	1
Chemistry	2
Communications	2
English	3
Geoscience	2
History	1
Humanities	1
Math	3
Music	1
Philosophy & Religion	1
Physics	2
Political Science	1
Psychology	2
Sociology & Anthropology	1
Theatre & Speech	1
Subtotal	24
School of Business	
Accounting/Finance	2
Economics	1
Management	2
Marketing	1
Other	1
Subtotal	7
School of Education	
Educ. Admin. & Supervision	2
Curriculum & Instruction	1
Health & Physical Education	1
Special Education	1
Others	1
Subtotal	6
School of Engineering	
Computer Science	4
Engineering	6
Subtotal	10
College of Health & Human Services	
Criminal Justice	1
Human Ecology	1
Human Services	2
Nursing	1
Other	1
Subtotal	6
Other	
Administration	9
Special Services	1
CECA	4
Library	3
TOTAL	**70**

DEMOGRAPHIC DATA OF INTERVIEWEES

1. Computer Usage of Respondents

Heavy	37
Average	11
Occasional	9
Non user	3
Not indicated	10

2. Personal Computer Owned by Respondents

Apple	8	KayPro CPM	1
Atari 800	1	Leading Edge	1
American AT Clone	1	LISA	1
BBC Acorn	1	Macintosh	32
Compaq	3	Morrow MD/2	1
Heath 150	1	NCR Desktop	1
HP's	3	Toshiba	1
IBM PC's	13	Zenith Z-100	1
IBM PC Clone	4		

3. Duration of Computer Usage of Respondents

1 - 2 years	2
2 - 5 years	8
5 - 10 years	11
10 -15 years	7
Over 15 years	26
Unknown	3

IBM PCs and Clones Owned by Respondents

American AT	1	NCR	1
Compaq	3	Toshiba	1
Heath 150	1	Zenith	1
IBM PC	13	Other	4
Leading Edge	1		

Apple Computers Owned by Respondents

Apple	8
LISA	1
Macintosh	32

Other Computers Owned by Respondents

Atari 800	1
BBC Acorn	1
HP	3
Kay Pro CPM	1
Morrow MD/2	1

APPENDIX D

MATRIX OF ANALYSIS OF RESPONSES

APPENDIX D

MATRIX OF ANALYSIS OF RESPONSES

ACCESS	Pct. Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
Micro/terminal in every office	79		1	2	1		1	1		5	2		3	2	2	1	1	1	2	7	32	45
More evening/weekend access	74	3	1	1			3	1	3	3	1		2	1	1	4			1	5	30	42
Micro clusters in all academic bldgs.	63			2						1	4	1	1	1	4	1	1	1	2	4	23	32
Online access to student data/cat.	53	1		2	1		1	3	3	1				1		1			2		16	23
More hardware/equipment	53	1	1	1	1					1	2		1		1			1	1		11	16
Longer cluster hours	37	3		1			1				1					1	1			1	9	13
Dorm access	21										1		1			1				2	5	7
Access for cont. ed. to microlabs	5																	1			1	1
College labs shared by depts.	5																	1			1	1
PC for each honor student	5										1										1	1
Comm. to operator from clusters	5																			1	1	1
																				Sum of responses	130	
																				Category percent	12	

Legend: The column "Pct. Grps" indicates the percentage of groups which discussed the topic, while the column "Pct. Resp" indicates the percentage of respondents who commented on the issue.

D.1

COMMUNICATIONS/NETWORK'G	Pct. Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
Campus-wide network	84	3	1	3		4	4	5	2	4	1			1	4	3	1	4	1	7	47	66
Email in each office	90		1		2	2	2	1	1	3	2	1	3	3	4	2	2	1	1	5	36	51
No or little E-mail	32				2						1	1					1	2	2		9	13
UTC bulletin board	32	3		1	1	2	1													1	9	13
Electronic data/file transfer	21	2	1	1			4														8	11
Training for E-mail	32			1							1		1	2				1		1	7	10
Inadequate phone lines	26					2	1	1								1	1				6	9
Teleconferencing (voice & graphics)	21					1		1			1									1	4	6
Student access to E-mail	11		2				1														3	4
Continued use of BITNET	16		1	1			1														3	4
University provided modems	5											1									1	1
Network peripherals	5							1													1	1

Sum of responses 134
Category percent 12

D.2

COMPUTER LITERACY	Pct. Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
Computers across curriculum	39	1					1			2			1			1			1	3	10	14
Separate short course (students)	26			2	1		1							1						3	8	11
Comp. literacy determined by dept.	32			2									1	2		1			1	1	8	11
No forced use	21	1		1							2	1									5	7
General Ed. course requirement	5											1									1	1
More emphasis on mainframe lit.	5												1								1	1
Justify non-use of computer	5										1										1	1
No across-the-board computing	5			1																	1	1

Sum of responses	35
Category percent	3

D3

CONSULTING/TRAINING	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
Hardware/software support	95	1	2		1	1	3	3	3	4	1	2	2	3	1	4	4	3	2	6	46	65
Short courses/seminars	79	3	2	4	2		2	4	4	4			1		1	1	1	2	2	7	40	56
Staff support for PCs	58		1		1	2				1	2		3		1	2		1	3	5	22	31
Software development support	26	1									2			1		2			2		8	11
Vendor demonstrations	37				1										1	1	1	1	1	1	7	10
Tech. support assigned to dept.	21	2	1								3		1								7	10
Improve documentation	26	1		1	2		1						1								6	9
Support for student training	16		2										1							1	4	6
Better comm. on resources avail.	21										1						1	1		1	4	6
Hot-line for help	16						1			1										1	3	4
Workshop/newsletter	11					1	2														3	4
Statistics consultant	11														2					1	3	4
User groups on campus	16												1			1				1	3	4
Quarterly catalog of services	5			1																	1	1
Catalog of software	5																			1	1	1

Sum of responses 158
Category percent 14

FACULTY SUPPORT	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	sum	Pct Resp
Released time	90	3	2	2	3	1	2	3	4	2	3	1	3	1	2	3	3		2	5	45	63
EDO recognition (softw. publication)	74	1	1	2				1	2		2		3	3	3	3	3	2	1	4	31	44
Monetary rewards	74	1	1	3		2	3		3	1	1		1		1	1	1		2	4	25	35
Grant support	47	1		1			2					1	1				3	1	1	2	13	18
More administrative support	26										2				2	1	4	1			10	14
100% royalties	26							2	1							1		1		2	7	10
Sabbatical	21			2	1		1													1	5	7
Equipment as reward	16			1		1					2										4	6
Faculty mentors	21																1	1	1	1	4	6
No rewards required	16		2							1		1									4	6
Travel/conference support	11		2														2				4	6
UTC purchase faculty equip.	11			1																1	2	3
Funds for maintenance of fac. equip.	5			2																	2	3
Modify student evaluation	5								1												1	1

Sum of responses	157
Category percent	14

D.5

INSTRUCTION	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
Electronic classroom facilities	74	2			3	2		2	3	4	2			3	1	3	3	1	1	5	35	49
Access to new instructional tech.	47	2	1	1		1	1		1		2						1		1		11	16
More CAI software	42	1		2				3	1					1	1	1			1		11	16
Larger teaching micro labs	21				1						1			1	1						4	6
Support for comp. integr. in curric.	79			1		1														1	3	4
Festival for comp. applics. to tchg.	11							1												1	2	3
														Sum of responses							66	
														Category percent							6	

D.6

HARDWARE/EQUIPMENT	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
More printers/plotters	74			2		1	1		2	2		2	3	1	3	2	1	1	1	4	26	37
State of the art equipment	58	1		1		1		1	1				1	1		2	2		1	2	14	20
Improved graphics	37	3	1	2		2		3	1	2											14	20
In-house technician (micros)	32	1				1	2		2		1									3	10	14
Engineering workstations	26	3						3			1					1				1	9	13
Digital scanners	21	2						2		1					1						6	9
VAX	21	1				2				2										1	6	9
Upgrade mainframe	16	2		2																1	5	7
New mainframe	21	1		1			1	1													4	6
Campus-wide maint. contract	21			1		1					1								1		4	6
Loaner equip. during servicing	16	1		1		1															3	4
Hard disk storage for micros	11			1		1															2	3
Improve cluster maintenance	11				1			1													2	3
Decentralize resources	5									1											1	1

Sum of responses	106
Category percent	10

D.7

LIBRARY	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
End user search (CD-ROM, online DB)	79		3	3	1	2		1		4	3	1	2	1	4	1	1		1	3	31	44
More ports to library	42				1	1	1						3		2		1		2	3	14	20
Checkout software/terminal/PC	37	1		2	3						1				1	1		1			10	14
Electronic retrieval/distribution	21					1	1		2								1				5	7
Terminals/PCs other floors	21	1		2								1				1					5	7
Online access to WESTLAW	21		2	1													1	1			5	7
Upgrade library computer	11												3							1	4	6
Computerized book orders	16			1													1			1	3	4
Digitized film and tape material	11			1	1																2	3
Improve user interface	11							1				1									2	3
															Sum of responses						81	
															Category percent						7	

D.8

POLICY AND ORGANIZATION	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
Plan for obsolescence	74	1		2			1	1	1			1	4	2	1	3	1	1	1	7	27	38
Separate computer budget line	68		2	2	1	1			1	2	1		1	1		1	1		3	3	20	28
More planning	32		1								3		4	1	1					2	12	17
Shift funding emph. toward micro	32												1	1	1	2	2			1	8	11
Students lease/purchase micros	21	1		1									1							1	4	6
Streamline purchasing	16						1			1										2	4	6
More space	21	1			1						1									1	4	6
Academic computing committee	16	1		1																1	3	4
Lab fees for computing	11												1	1							2	3
Update acad. comp. plan annually	11										1								1		2	3
Percentage based app. to budget'g	5										1										1	1
Common mgmt-data & voice trans.	5					1															1	1
Dept'l liasions in acad. comp.	5																			1	1	1
Coord. acad. and admin. computing	5							1													1	1
Liberal arts rep on acad comp comm	5										1										1	1
Pursue corporate donors	5																			1	1	1
Rent supercomputer time	5																			1	1	1
Single agency funds comp. grants	5			1																	1	1
Bookstore source - softw & hardw	5																			1	1	1
													Sum of responses								95	
													Category percent								9	

PUBLIC SERVICE	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
More public access to computers	32				1		1			1			2		2	1					8	11
More media cov. of acad. computing	26	1														1	1		1	2	6	9
Summer computer camp	16										1				1					1	3	4
Short courses for public	11									1						1					2	3
Fees for consulting	11				1								1								2	3
Computer facility for handicapped	11										1				1						2	3
CECA grants to community	5																1				1	1
More support before more service	5												1								1	1
Electronic bulletin board	5																1				1	1
														Sum of responses							26	
														Category percent							2	

SECURITY	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
Staff each micro cluster	95		1	1	3	1	2	2	2	3	1	1	2	1	1	2	1	2	2	5	33	47
Lock down micros	37		2				2				1				1			1	1	3	11	16
Elect. monitoring/alarm systems	32	2					1	2		1					1					2	9	13
File servers for labs/clusters	21	1									2				1					3	7	10
Unstaffed clusters/roving guards	26	1	1												1				1	1	5	7
Push button locks	21	1													1	1				1	4	6
Piracy prevention	11								1	1											2	3
															Sum of responses						71	
															Category percent						7	

STANDARDS	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
Support selected configurations	58		1	1	4	3	4	2	1	1							1		1	3	22	31
Department sets standards	58	1	2	2					2	1	2				2		2	3	2	1	20	28
No standards needed (low priority)	37			2				1			1				1	1		1	1		8	11
Standards at school level	26											1	3		2	1				1	8	11
Standardize administrative systems	32	1	1								2		1	1					1		7	10
Standards at univ. level	21	2			1		1			2											6	9
Driven by market	11			2		1															3	4

SOFTWARE	Pct Grps	GROUP 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Sum	Pct Resp
Software review mechanism	47				1			1			1			2	2	1	1	2		2	13	18
More micro pkgs. from university	47	2	1	3					1				1	1		1	1		1		12	17
Univ. should pursue site licenses	37			1			1	1	2					1	1					1	8	11
Update purchased data bases	26		2					2		1			1			1					7	10
Software clearing house	21	1		2		1		2													6	9
Need better mainframe software	21	3						1		1									1		6	9
UNIX operating system	16			1				2		1											4	6
CAD/CAM software	16	1		1															1		3	4
Micro stat. packages	16		1							1					1						3	4
SYMAP or MAXIMA	11									1					1						2	3
Micro symbolic manipulator	5													2							2	3
Authoring systems	11			1					1												2	3
CASE tools, 4th gen lang.	5									1											1	1
Expert systems	5	1																			1	1

Sum of responses	70
Category percent	6

TOTAL OF ALL RESPONSES 1097

APPENDIX E

COMPUTER CURRICULUM INTEGRATION SURVEY (1987)

APPENDIX E

CENTER OF EXCELLENCE FOR COMPUTER APPLICATIONS (CECA)

ACADEMIC COMPUTING QUESTIONNAIRE (1987)

General Information (N = 70)

1. With which College/School are you affiliated?

College of Arts and Science	34	(48.6%)
College of Health and Human Services	6	(8.6%)
School of Education	12	(17.1%)
School of Business Administration	6	(8.6%)
School of Engineering	12	(17.1%)

2. Approximately how long have you been at UTC? (Check one.)

less than 1 year	6	(8.6%)	11 to 15 years	9	(12.9%)
1 to 5 years	15	(21.4%)	more than 15 years	23	(32.9%)
6 to 10 years	16	(22.9%)	not stated	1	(1.4%)

3. Approximately how long have you been using computers? (Check one.)

less than 3 months	2	(2.9%)	1-2 years	4	(5.7%)
3-6 months	2	(2.9%)	more than 2 years but less than 5 years	14	(20.0%)
7-11 months	0	(0.0%)	more than 5 years	47	(67.1%)
			not stated	1	(1.4%)

I. Hardware

1. With which of the UTC Academic Computing systems are you familiar?

All of them	10	(14.5%)	IBM 4381	3	(4.3%)
HP3000 systems	15	(21.7%)	RJE link to UT-K	0	(0.0%)
Library system	11	(15.9%)	None of them	13	(18.8%)
HP3000 and Library	17	(24.6%)	Not stated	1	

2. Rank the following UTC mainframe computer resources you have used since January 1987 based on the frequency with which you have used them. (Leave blank any which do not apply and use the scale 1=most frequently used, 2=second most frequently used, etc.)

	Mean	Median	Number Responding
HP 3000 Series III	2.565	2.0	23
HP 3000 Series 44/58	2.286	2.0	28
IBM 4381	1.889	1.0	18
Lupton Library System	2.256	1.5	40
RJE link to IBM 370s at UT-K	4.167	3.5	6
Link to DEC at UT-K	2.667	2.5	6

There are six clusters of terminals which can be used to access the HP3000 and IBM 4381 computer systems.

3. Rank the following clusters you have used since the start of the Fall '86 semester in terms of the frequency of use. Leave blank any which do not apply and use the scale 1=most frequently used, 2=second most frequently used, etc.

	Mean	Median	Number Responding
Hunter 401	2.462	2.0	13
Grote 320 (HP 3000)	1.733	2.0	15
Grote 219 (IBM 4381)	1.154	1.0	13
Library	1.741	2.0	27
Holt 101	1.500	1.0	12
Hooper 250 (HP 3000)	0.000	0.0	0
Fletcher 307D	1.200	1.0	5

4. If you use one of the terminal clusters, in general, how often do you have to wait for a terminal?

I never have to wait	24	(53.3%)
I rarely have to wait	13	(28.9%)
I occasionally have to wait	7	(15.6%)
I almost always have to wait	1	(2.2%)
I always have to wait	0	(0.0%)
Not stated	25	

5. How satisfied are you with the hours of operation of those clusters which you use? (Check one.)

Very satisfied	17	(36.2%)	Dissatisfied	5	(10.6%)
Satisfied	16	(34.0%)	Very dissatisfied	6	(12.8%)
Undecided	3	(6.4%)	Not stated	23	

II. Software

1. Rank the source of the software used in your department. (Leave blank any which do not apply and use the scale 1=most frequent source, 2=second most frequent source, etc.)

	Mean	Median	Number Responding
From HP sources	1.9	2.0	24
From IBM sources	1.6	1.0	17
From educational clearinghouses	2.3	2.0	16
From other commercial sources	1.5	1.0	34
Developed within the department	2.4	2.0	16
Other departments at UTC	2.8	2.0	5
Other universities	3.4	3.0	10
Other (please specify)	1.7	1.5	6

2. What support would you need in order to use more commercial software? (Leave blank any which do no apply and use the scale 1=most needed, 2=second most needed, etc.).

	Mean	Median	Number Responding
demonstration of software	2.9	3.0	31
access to evaluation copies	2.4	2.0	31
funds to purchase	1.6	1.0	44
vendor discounts	3.4	3.0	16
release time	2.2	2.0	29
grants	2.8	2.0	20
other (specify)	4.3	6.0	3

3. Regarding the software purchased by your department, which category best describes the usage? It is used by:

the purchaser only	13	(22.%)
faculty within department	36	(61.0%)
staff within department	4	(6.8%)
other faculty on campus	4	(6.8%)
not indicated	17	

4. Please check yes or no according to whether you have used the following software. Also, if you have used the software, please mark the amount of use line and the satisfaction line according to your usage and satisfaction.

Amount of Use

Note - 5 = Very Heavy Use
4 = Heavy Use
3 = Moderate
2 = Light Use
1 = Very Light Use

Satisfaction Level

Note - 5 = Very Satisfied
4 = Satisfied
3 = Neutral
2 = Dissatisfied
1 = Very Dissatisfied

Example: You use Software Y moderately and you are very satisfied with the product.

		Amount of Use	Satisfaction
Software Y:	Yes __X__ No ____	_____3_____	_____5____

	Used?*		Amount of Use		Satisfaction	
	Yes	No	Mean	Median	Mean	Median
Languages:						
FORTRAN 77	14	18	2.5	2.0	4.1	4.0
FORTRAN 66	8	8	1.9	2.0	3.3	4.0
VS-FORTRAN	6	8	2.8	3.0	3.6	4.0
FORTRAN/WATFIV	10	6	2.4	2.0	4.4	5.0
COBOL/COBOL II	3	10	2.0	2.0	4.0	4.0
WATBOL	1	10	0.0	0.0	0.0	0.0

	Used?*		Amount of Use		Satisfaction	
	Yes	No	Mean	Median	Mean	Median
Languages (cont'd)						
Pascal	12	6	2.6	2.5	3.3	3.0
BASIC	27	1	2.7	2.5	4.1	4.0
ASSEMBLER/ASSIST	6	7	3.0	3.0	3.8	4.0
PL/I and PL/C	9	5	4.2	4.0	4.0	4.0
M-PROLOG	3	9	3.0	3.0	2.0	2.0
LISP	1	23	3.0	3.0	1.0	1.0
Data Base Management:						
Query	6	19	3.0	2.0	4.3	4.0
Image	4	21	3.0	3.0	4.0	4.5
KSAM	2	21	2.5	2.5	2.7	3.0
Statistical Package:						
SAS	13	18	2.3	2.0	3.8	4.0
SPSS/SPSSM	25	16	3.0	3.0	4.0	4.0
SPSS-X	6	19	3.2	3.0	4.0	4.0
BMDP	8	20	2.8	2.5	3.6	3.0
IMSL	2	23	3.5	3.5	5.0	5.0
Word Processors:						
TDP	18	17	3.1	3.0	3.5	4.0
QEDIT	13	19	2.8	3.0	3.4	4.0
EDIT/3000	18	16	2.8	3.0	3.5	4.0
Engineering Package:						
ANSYS	3	23	1.0	1.0	4.0	4.0
LINDO	5	23	2.0	2.0	4.0	4.0
CADAM	4	21	2.8	2.5	3.8	3.5
DISSPLA	2	23	3.0	3.0	2.0	2.0
SMP	1	23	3.0	3.0	3.0	3.0

* Those who did not answer are omitted from the category.

5. What types of software are most needed on the mainframes? (Leave blank any which do not apply and use the scale 1=most needed, 2=second most needed, etc.)

HP3000	Mean	Median	Number Responding
Statistical packages	1.8	2.0	19
Language compilers	1.7	1.0	9
Computer assisted instruction	2.5	2.0	19
Simulations	3.6	4.0	13
Graphics packages	2.9	2.0	10
Word processors	2.7	2.0	14

IBM 4381	Mean	Median	Number Responding
Statistical packages	2.5	2.0	11
Language compilers	1.2	1.0	12
Computer assisted instruction	3.1	3.0	8
Simulations	2.7	2.5	10
Graphics packages	2.8	3.0	10
Word processors	2.4	2.0	7

6. What types of software are most needed on the micros? (Leave blank any which do not apply and use the scale 1=most needed, 2=second most needed, etc.)

IBM PC	Mean	Median	Number Responding
Statistical packages	3.1	3.0	13
Language compilers	2.4	2.0	12
Computer assisted instruction	3.4	4.0	14
Simulations	3.6	3.0	9
Graphics packages	2.8	3.0	17
Word processors	1.7	1.0	16

Apple IIe	Mean	Median	Number Responding
Statistical packages	4.5	5.0	4
Language compilers	2.7	1.0	3
Computer assisted instruction	1.9	1.0	7
Simulations	2.7	2.0	3
Graphics packages	2.8	3.0	5
Word processors	2.1	2.0	7

Macintosh	Mean	Median	Number Responding
Statistical packages	2.9	2.0	18
Language compilers	2.1	2.0	7
Computer assisted instruction	2.3	1.5	18
Simulations	3.2	3.0	11
Graphics packages	2.3	2.5	16
Word processors	1.9	2.0	20

7. In your department, which best describes the role of Computer Assisted Learning (CAL)?

Very few if any classes use it	30	(53.6%)
Some classes assign CAL as a course requirement	12	(21.4%)
Some classes assign CAL as a course enhancement	12	(21.4%)
CAL materials form the major content of the course	2	(3.6%)
No responses	14	

III. Microcomputers

1. Do you own a microcomputer?

Yes 63 (90%) No 6 (8.6%) No answer 1

2. What brand of microcomputer do you own?

Apple IIe	6 (9.4%)	Compaq	3 (4.7%)
Apple Macintosh	35 (54.7%)	Tandy	1 (1.6%)
IBM PC	12 (18.8%)	Other	6 (11.0%)
HP 150 or HP 110	1 (1.6%)	Not Stated	6

3. For what applications do you use your microcomputer? (Leave blank any which do not apply and use the scale 5= very heavy use, 4=heavy use, 3=moderate use, 2=light use, 1=very light use).

	Mean	Median	Number Responding
Word Processing	4.0	5.0	49
Spreadsheets	2.8	3.0	29
Graphics	3.2	3.0	26
CAD/CAM	3.5	3.5	6
Simulations/Games	1.9	2.0	20
Developing courseware	3.3	3.0	17
Other (please specify)	3.3	3.0	19

4. When you buy your next micro, what brand would you select?

Apple IIe	0	Compaq	2. (3.8%)
Apple Macintosh	31 (59.6%)	Tandy	1 (1.9%)
IBM PC	14 (26.9%)	Other	4 (7.7%)
HP 110, 150 or Vectras	0	Not stated	18

5. If you do not own a microcomputer, do you intend to buy one in the next two years? (8 responses)

Yes 6 (75.0%) No 2 (25.0%)

6. What brand of microcomputer would you purchase? (6 responses)

Apple IIe	1 (16.7%)	Compaq	0
Apple Macintosh	4 (66.7%)	Tandy	0
IBM PC	0	Other	1 (16.7%)
HP 110, 150 or Vectras	0		

7. Rank the following UTC microcomputer resources you have used since January 1987 based on the frequency with which you have used them. (Leave blank any which do not apply and use the scale 1=most frequently used, 2=second most frequently used, etc.)

	Mean	Median	Number Responding
Apple IIe (Hunter 407)	3.1	2.0	15
IBM PC (Hunter 407)	3.5	2.0	11
IBM PC (Grote)	2.3	1.0	15
IBM PC (Fletcher)	1.8	1.5	6
Macintosh (Hunter 407/408)	1.9	1.0	15
Do not use Labs	5.9	6.0	22

8. If you use one of the micro labs, in general, how often do you have to wait (during open lab hours) for a microcomputer to be available? (Check one)

I never have to wait	19	(54.3%)
I rarely have to wait	4	(11.4%)
I occasionally have to wait	10	(28.6%)
I almost always have to wait	1	(2.9%)
I always have to wait	1	(2.9%)
No response	35	

9. During what hours do you MOST often use the micro lab? (Check one)

8 a.m. to noon	6	(17.1%)
noon to 3 p.m.	13	(37.1%)
3 p.m. to 5 p.m.	7	(20.0%)
after 5 p.m.	9	(25.7%)
Not Stated	35	

10. How satisfied are you with the hours of operation of those labs which you use? (Check one)

Very satisfied	6	(16.2%)	Dissatisfied	6	(16.2%)
Satisfied	13	(35.1%)	Very dissatisfied	4	(10.8%)
Undecided	6	(16.2%)	Not applicable	2	(5.4%)

IV. Telecommunications

There are 16 phone lines (dial-ups) available so that faculty, staff and students can access either the HP3000 or IBM 4381 or the Lupton Library system from home or the office. Six of these dial-ups are for 300 baud modems, while the remaining 10 are for 1200 baud modems.

1. Were you aware these facilities were available?

Yes 50 (76.9%) No 14 (21.5%) No answer 16

2. Have you used the dial-up facilities currently available to access the HP3000's, IBM 4381 or Lupton Library? (Check one)

4	(7.1%)	Did not know they were available
23	(41.1%)	No

Yes, I dial up: (check all that apply)

16	(28.6%)	HP3000
3	(4.3%)	IBM 4381
3	(5.4%)	Lupton Library
2	(3.6%)	All three of the above
5	(8.9%)	HP/Library

I have a:

7	(24.1%)	300 baud modem
15	(51.7%)	1200 baud modem
5	(17.2%)	2400 baud modem
2	(6.8%)	Other
41		No response

3. If you answered "yes" to the previous question, how often do you dial-up successfully on the first try? (Check one)

Always on the first try	4	(13.8%)	Rarely on the first try	7	(24.1%)
Usually on the first try	14	(48.3%)	Never on the first try	1	(3.4%)
Occasionally on the first try	3	(10.3%)	No response	41	

V. Graphics and Letter Quality Printers

A high speed HP 2680 Laser printer is available through the HP3000 system. A Macintosh Laser printer is available for faculty use in Hunter 408.

1. If you have a need for letter quality printing, from which of the following systems would you most likely use? (Check one)

IBM 4381	2	(3.1%)
IBM PC microcomputer	16	(25.0%)
HP 2680 Laser Printer	6	(9.4%)
Apple IIe microcomputer	4	(6.3%)
Apple Macintosh microcomputer	34	(53.1%)
I do not have need for quality printing	2	(3.1%)
Not stated	6	

2. If you have a need for computer graphics and plotting, which of the following systems would you most likely use? (Check one)

IBM 4381	4	(6.9%)
IBM PC microcomputer	15	(25.9%)
Apple microcomputer	2	(3.4%)
Apple Macintosh (Mac Plus, Mac SE, and Mac II)	34	(58.6%)
I do not have need for graphics and plotting	3	(5.2%)
Not stated	12	

VI. Other Services

1. CECA Newsletter

Each quarter (September, December, June, March) a CECA Newsletter is distributed, free-of-charge, to UTC faculty and staff who request a copy.

1. Are you familiar with the CECA Newsletter?

Yes 60 (88.2%) No 8 (11.8%) No answer 2

If you answered "no", please go to the next section (Short Courses and Workshops).

2. Are you on the CECA Newsletter mailing list?

Yes 55 (91.7%) No 5 (8.3%) No answer 10

3. In general, how beneficial has the CECA Newsletter been to you? (Check one)

Very beneficial	6 (10.7%)
Beneficial	42 (75.0%)
Not at all beneficial	4 (7.1%)
Not applicable	4 (7.1%)
Not stated	14

2. Short Courses and Workshops

Each semester CECA offers, free-of-charge to UTC faculty and staff, a series of workshops and short courses on computer related topics such as word processors, spreadsheets, desktop publishing and usage of microcomputers.

1. Did you know these workshops were offered?

Yes 63 (91.3%) No 6 (8.7%) No answer 1

2. Have you attended these workshops?

Yes 28 (42.4%) No 38 (57.6%) No answer 4

3. In what workshops or short courses are you interested? (Leave blank any which do not apply and use the scale 1=most interested, 2=second most interested, etc.).

	Mean	Median	Number Responding
Word Processing	1.7	1.0	17
Spreadsheets	2.1	2.0	14
Graphics	2.7	2.0	17
Intro to micros	2.0	2.0	5
Computer Languages	2.1	2.0	9
Hard Disk Mgmt.	2.8	3.0	8
Courseware development	1.6	1.0	17

4. If you have taken any of these short courses, how beneficial have they been to you? (Check one)

Very beneficial	7	(20.0%)
Beneficial	18	(51.4%)
Not at all beneficial	3	(8.6%)
Not applicable	7	(20.0%)
No answer	35	

VII. Computer Curriculum Integration (CCI)

1. Are you familiar with the CCI project?

Yes 58 (84.1%) No 11 (15.9%) No answer 1

2. Have you ever submitted a proposal to CCI?

Yes 23 (34.3%) No 43 (64.2%) No answer 4

3. Have any of your proposals been funded by CCI?

Yes 14 (33.3%) No 27 (64.3%) No answer 29

4. Have you, or do you want to, develop software for use by your students?

Yes	35 (53.0%)	Don't know	11 (16.7%)
No	20 (30.3%)	Not stated	4

5. Which of the following factors hinder you in developing software? (Leave blank any which do not apply and use the scale 1=greatest hindrance, 2= second greatest hindrance, etc.)

	Mean	Median	Number Responding
Lack of hardware	2.0	2.0	6
Lack of access to micros	4.0	4.0	1
Lack of authoring software	2.7	3.0	12
Lack of personal time for this activity	1.4	1.0	23
Obtaining release time	1.7	2.0	19

6. What assistance would you need in order to develop courseware for your classes? (Leave blank any which do not apply and use the scale 1=most needed, 2=second most needed, etc.)

	Mean	Median	Number Responding
Access to micros	2.2	2.0	6
Release time	1.4	1.0	26
Additional funds	2.1	2.0	13
Graduate Assistants	2.8	3.0	10
Authoring packages	2.1	2.0	14
Workshops on use of authoring pkgs.	2.3	2.0	22

7. In your department, which best describes the role of Computer Assisted Learning (CAL)?

Very few, if any, classes use it	34	(56.7%)
Some classes assign CAL as a course requirement	13	(21.7%)
Some classes assign CAL as a course enhancement	12	(20.0%)
CAL materials form the major content of the course	1	(1.7%)
Not stated	10	

APPENDIX F

EXCERPTS FROM 1988 INVENTORY OF COURSES

FY 1987 - 88 Inventory

The 1988 Inventory is the ninth in the series published on a regular basis since 1976. These nine documents have provided valuable information about the changing status of computer usage in the curricula at UTC. The 11 tables included in this FY 87 - 88 Inventory provide a comparison between annual inventories and also demonstrate growth patterns. The first six tables summarize the information obtained from the departmental reports (pages 16 - 51). Tables 7 and 8 show the connect time and CPU times for different accounts on the HP3000 systems from 1984 to 1988. Table 9 reports usage of the RJE facilities to UT-K for the years 1984 to the present. Tables 10 and 11 report the usage of the IBM 4381 system for the past two years by department and by month.

In 1976, when the first inventory was conducted, faculty and students had access to only two computer facilities--the HP2000 and a remote line to the IBM 360 computers at UT-K. In contrast, the UTC community could choose to use one of four microcomputer clusters or to access one of three available mainframe systems in FY 1987-88. This growth in reflected in the 1988 Inventory of Courses which shows that the number of courses using computers has more than tripled in the period 1976 to 1988. For example, since last year's inventory, 12 additional courses have incorporated computer usage--an approximately 20% increase. In addition, FY 1987 - 88 continues the trend of two previous inventories which showed a rise in microcomputer usage and a corresponding drop in mainframe usage.

TABLE 1

Number of Courses Using Computers (1976-1988)

(Addition sign after number indicates "at least")

DEPARTMENT	Average 1976-1982	1984	1985	1986	1987	1988
College of Arts & Sciences						
Art	0	4	3	5	2	3
Biology	1	3	3	3	3	4
Chemistry	7	8	9	11	10	10
Communications	-	-	-	-	-	1
English	2	3	3	3	4	5
Environmental Studies	0	2	2	*	*	*
Foreign Language	2	6	6	6	6	6
General Science	2	0	1	1	1	1
Geoscience	0	1	1	3	3	7
Interdisc. Studies	0	1	1	1	1	0
Mathematics	9	12	8	7	7	7
Music	4	4	4	4	4	4
Physics	6	6	6	10	10	13
Political Science	1	2	2	4	4	4
Psychology	7	8+	9	9	9	11
Sociology/Anthropology	1	1	1	1	1	1
Subtotal	42	61+	59	68	65	77
School of Business						
Accounting/Finance	1	3	6	12	15	15
Business Administration	4	-	-	-	-	-
Economics	1	0	0	0	0	0
Management/Marketing	5	-	-	-	-	-
Management	-	9	12	11	14	14
Marketing	-	0	0	1	1	1
Office Administration	0	2	3	3	4	2
Subtotal	11	14	21	27	34	32
School of Education						
Education	2	-	-	-	-	-
Educational Administration & Supervision (counted under Ed.)	1	3	2	2	2	2
Curriculum & Instruction	0	4	4	4	4	2
Health & Physical Education	1	1	1	1	1	2
Home Economics	1	0	0	0	0	0
Special Education	0	2	2	2	2	0
Subtotal	5	10	9	9	9	6

Number of Courses Using Computers (cont'd)

DEPARTMENT	Average 1976-1982	1984	1985	1986	1987	1988
School of Engineering						
Computer Science	16	26	30	31	30	32
Engineering	17	16	23	33	33	36
Subtotal	33	42	53	64	63	68
School of Health and Human Services						
Criminal Justice	1	4	6	6	6	6
Human Services	-	-	-	-	-	4
Nursing	0	1	1	0	0	0
Social Work	1	1	1	1	3	2
Subtotal	2	6	8	7	9	12
Undergraduate and Special Services						
Special Services	0	0	1	1	1	1
Subtotal	0	0	1	1	1	1
GRAND TOTAL (All Departments)	93	133	151	176	181	196

Note: Departments with no computer usage have zeros in those columns.
Departments which have been reorganized or created since 1978 have dashes (-).

* In FY 85-86 Environmental Studies & Geosciences were combined.

TABLE 2

Summary of Faculty Computer Usage (1976-1988)

(Addition sign after number indicates "at least")

DEPARTMENT	Average 1976-1982	1984	1985	1986	1987	1988
College of Arts & Sciences						
Art	0	1	1	1	1	1
Biology	1	2	2	2	2	2
Chemistry	6	9	9	10	9	7+
Communications	-	-	-	-	-	1
English	7+	10+	10+	10+	10+	2+
Environmental Studies	0	0	3	2*	2*	*
Foreign Language	0	1	1	1	1	1
General Science	1	0	1	1	1	1
Geoscience	0	1	1	2	1	3+
Interdisc. Studies	0	1	1	1	1	0
Mathematics	10+	8	4	6	6	6
Music	5	3	3	3	3	2
Physics	4+	4	4	5	5	6
Political Science	1	2	2	3	3	3
Psychology	4+	3	4	4	4	5
Sociology/Anthropology	1	3	4	1	3	3
Subtotal	39+	48+	50+	52+	52+	43+
School of Business						
Accounting/Finance	1	2	6	8	10	10
Business Administration	2	-	-	-	-	-
Economics	1	0	0	0	0	0
Management/Marketing	2	-	-	-	-	-
Management	-	7	8	5	7	8
Marketing	-	0	0	1	1	1
Office Administration	0	2	1	1	2	2
Subtotal	6	11	15	15	20	21
School of Education						
Education	2	-	-	-	-	-
Educational Administration & Supervision (counted under Ed.)	0	2	2	-	1	1
Curriculum & Instruction	0	4	3	3	3	2
Health & Physical Education	1	1	1	1	1	2
Home Economics	1	0	0	0	0	0
Special Education	0	1	1	1	1	0
Subtotal	4	8	7	6	6	5

Summary of Computer Usage by Faculty (cont'd)

DEPARTMENT	Average 1976-1982	1984	1985	1986	1987	1988
School of Engineering						
Computer Science	14+	9+	11+	11+	10+	10+
Engineering	9+	10+	10+	10+	19+	21+
Subtotal	23+	19+	21+	21+	29+	31+
School of Health and Human Services						
Criminal Justice	1	2+	4+	4+	4+	5+
Human Services	-	-	-	-	-	4
Nursing	0	1	1	0	0	0
Social Work	1	1	1	2	1	1
Subtotal	2	4+	6+	6+	5+	10+
Undergraduate and Special Services						
Special Services	0	0	0	0	2	2
Subtotal	0	0	0	0	2	2
GRAND TOTAL (All Departments)	74+	90+	99+	100+	114+	112+

Note: Departments with no computer usage have zeros in those columns.
Departments which have been reorganized or created since 1978 have dashes (-).

* In FY 85-86 Environmental Studies & Geosciences were combined.

TABLE 3

Primary Method of Using Computers in Course

	Average 1978-1982	1984	1985	1986	1987	1988
Simulation	26	16	16	20	16	15
CAI	25	23	27	30	26	20
Problem Solving	30	38	52	62	66	65
Data Analysis	23	31	32	32	28	28
Graphics	2	12	6	8	3	4
Multi-Use	0	0	7	14	34	44
Word Processing	0	2	0	2	1	9
Report Writing	0	0	2	1	1	1
Others (Logic &Systems Design, etc.)	3	10	6	5	4	8
Not stated	0	0	3	2	2	2
Total	109	132	151	176	181	196

Explanation of Terms Used in Table 3

Types of Material	Description
Simulation	Computer modeling or simulation of real world events so as to achieve a measure of realism (e.g. GHETTO, many of the CONDUIT packages).
CAI (Computer Aided Instruction)	Material of both a tutorial and remedial nature. The computer has some management of the material that is presented. (e.g. English CAI).
Problem Solving	Programs composed by students to solve a problem. Also, it can refer to the execution of an existing program that has already been entered (canned program).
Data Analysis	Prepared programs which may be used in either interactive or batch mode. These packages may be applied either to student-entered data or existing data sets. (e.g. SPSS, QSTAT, BMDP, SAS, etc.)
Graphics	Programs (either "canned" or written by students) which display lines, curves, points, etc. on terminals. (Generally either the Tektronix 4107 or HP XY Plotter are used.)

TABLE 4

Relationship of Computing to Course

Number of Courses

	Average 1978-1982	1984	1985	1986	1987	1988
Integral	54	85	99	121	129	147
Integral/Supplementary	4	3	0	0	0	0
Supplementary	29	30	30	34	30	32
Supplementary/Incidental	2	0	2	3	2	3
Incidental or not required	16	13	16	15	18	12
Not stated	1	1	4	3	2	2
Total	106	132	151	176	181	196

****

Relationship of Computing to Course by Percentage

Percentage of Courses

	Average 1978-1982	1984	1985	1986	1987	1988
Integral	49.5%	64.4%	65.6%	68.8%	71.3%	75.0%
Integral/Supplementary	3.9%	2.2%	0.0%	0.0%	0.0%	0.0%
Supplementary	25.5%	22.7%	19.9%	19.3%	16.6%	16.4%
Supplementary/Incidental	1.8%	0.0%	1.3%	1.7%	1.1%	1.5%
Incidental or not required	.9%	9.9%	10.6%	8.5%	9.9%	6.1%
Not stated	.9%	0.7%	2.6%	1.7%	1.1%	1.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Explanation of Terms Used in Table 4

Integral - the use of the computer is mandatory in the course and affects the grades.

Supplemental - The use of the computer is an enhancement to the course material but is not mandatory. Students are urged to use the material for self improvement.

Incidental/Not required - Students are informed of computer materials related to the course but are not required to use them.

TABLE 5

Computer Usage - Number of Hours Per Student Per Semester

Number of Courses

	Average 1978-1982	1984	1985	1986	1987	1988
0 hrs.*	0	0	1	1	1	1
0-5 hrs.	43	47	52	75	81	79
6-10 hrs.	30	33	28	41	41	48
11-25 hrs.	14	22	36	24	33	28
26+ hrs.	22	27	29	31	23	38
Not stated	1	3	5	4	2	2
Total	110	132	151	176	181	196

****

Computer Usage - Percent of Hours Per Student Per Semester

Percentage of Courses

	Average 1978-1982	1984	1985	1986	1987	1988
0 hrs.*	0.0%	0.0%	0.7%	0.5%	0.5%	0.5%
0-5 hrs.	39.2%	35.6%	34.4%	42.6%	44.8%	40.3%
6-10 hrs.	26.8%	25.0%	18.5%	23.3%	22.7%	24.5%
11-25 hrs.	12.9%	16.7%	23.9%	13.6%	18.2%	14.3%
26+ hrs.	20.2%	20.5%	19.2%	17.6%	12.7%	19.4%
Not stated	.9%	2.2%	3.3%	2.3%	1.1%	1.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* Used for record keeping, no actual student activity.

Explanation of Terms Used in Table 5

This is the measure of the total hours each student spent on the computer in a course during a semester.

0 - 5 hours	light usage
6 - 10 hours	moderate usage
11 - 25 hours	heavy usage
26+ hours	extensive usage

TABLE 6

Computer Facilities Used in Curricula 1988

DEPARTMENT	Number of Courses Using Facilities** HP3000	IBM 4381	Micros	RJE to UTK	Other*
College of Arts & Sciences					
Art			3		
Biology	2		4		
Chemistry	9		3		1
Communications	1				
English			5		
Environmental Studies					
Foreign Language			6		
General Science			1		
Geoscience	2		5		
Interdisc. Studies					
Mathematics	7				
Music	4				
Physics	8		11		
Political Science	4				
Psychology	9		3		
Sociology/Anthropology	1				
Subtotal	47	0	41	0	1
School of Business Administration					
Accounting/Finance	1		14		
Business Administration					
Economics					
Management/Marketing					
Management	7	6	12		
Marketing	1				
Office Administration					2
Subtotal	9	6	26	0	2
School of Education					
Educational Administration & Supervision (counted under Ed.)	2				
Curriculum & Instruction			2		
Health & Physical Education	2				
Home Economics					
Special Education					
Subtotal	4	0	2	0	0

Computer Facilities Used in Curricula 1988 (cont'd)

DEPARTMENT	HP3000	IBM 4381	Micros	RJE to UTK	Other*
School of Engineering					
Computer Science	7	29	13		4
Engineering	12	14	8		7
Subtotal	19	43	21	0	11
College of Health and Human Services					
Criminal Justice	6				
Human Services			4		
Nursing					
Social Work	2				
Subtotal	8	0	4	0	0
Undergraduate and Special Programs					
Special Services			1		
Subtotal	0	0	1	0	0
GRAND TOTAL (229) (All Departments)	87	49	95	0	14

* Includes PLATO system used by Engineering Department.
** Because more than one system was used in some courses, totals may not correspond to totals in previous tables.

DEPARTMENT	HP3000	IBM 4381	Micros	RJE to UTK	Other
College of Arts & Sciences	47	0	41	0	1
School of Business Administration	9	6	26	0	2
School of Education	4	0	2	0	0
School of Engineering	19	43	21	0	11
College of Health and Human Services	8	0	4	0	0
Undergraduate and Special Programs					
Total	87	49	95	0	14

TABLE 7

Connect Time of HP3000 Systems

DEPARTMENT	1983-84	1984-85	1985-86	1986-87	1987-88
Academic Computing	3295	3525	4457	3956	4598
Archaeology	249	35	0	2	0
Barter Computer	557	682	62	73	351
Biology	339	241	106	10	0
Business Administration -					
Accounting	361	163	70	274	286
Economics	172	146	60	263	120
Management	1139	2766	2255	2215	3239
Marketing	2180	615	45	60	16
Office Administration	1439	216	1	3	0
General	47	374	952	311	0
CECA	-	-	48	24	8
Chemistry	607	473	334	254	272
Communications	0	30	308	59	248
Computer Science	44944	41333	28858	7117	1624
Education -					
Admin. & Superv.	876	976	1267	705	928
Curr. & Inst.	53	4	24	27	37
Health & P.E.	8	13	25	101	6
Home Economics	36	22	4	0	0
Special Ed.	1	154	11	0	0
Engineering	14938	14093	7776	8634	3178
English	0	2	4	20	27
Environmental Studies	138	138	198	58	74
Foreign Language	-	-	26	0	0
Geoscience	166	142	22	53	0
GIS (Admissions)	1302	768	495	339	0
History	76	53	206	31	61
Health and Human Services -					
Criminal Justice	375	112	203	134	71
Nursing	-	-	52	19	100
Social Work	500	531	398	658	413
Library	109	397	653	390	384
Mathematics	3056	3539	3265	3110	4829
Music	50	0	25	1	49
Physics	730	779	388	355	555
Political Science	93	124	306	105	167
Psychology	1012	686	1063	874	2048
School - City	1585	589	362	11	1
County	369	20	0	5	3
Sociology	140	53	42	3	0
Undergrad. & Special Programs	8	1	58	90	120
Unspecified/System	17156	11965	12960	14122	26215
UTK (Graduate)	171	143	284	226	757
Word Processing	1965	4723	3951	4124	3742
TOTAL	100491	90628	71625	48714	54527

TABLE 8

CPU Time on HP3000 Systems

DEPARTMENT	1983-84	1984-85	1985-86	1986-87	1987-88
Academic Computing	65	72	107	78	96
Archaeology	8	1	0	0	0
Barter Computer	25	23	2	2	2
Biology	9	17	2	1	0
Business Administration -					
Accounting	6	6	2	30	6
Economics	2	2	2	5	2
Management	18	32	42	55	35
Marketing	41	12	2	3	0
Office Administration	15	1	0	0	0
General	9	8	22	8	0
CECA	-	-	3	2	0
Chemistry	69	45	52	42	11
Communications	0	1	48	1	6
Computer Science	655	578	531	91	20
Education -					
Admin. & Superv.	19	18	25	12	16
Curr. & Inst.	1	0	1	1	1
Health & P.E.	0	0	1	0	0
Home Economics	1	3	0	0	0
Special Ed.	0	2	0	0	0
Engineering	284	359	180	162	55
English	0	0	2	0	0
Environmental Studies	7	2	3	2	1
Foreign Language	-	-	1	0	0
Geoscience	2	2	1	1	0
GIS (Admissions)	6	7	5	2	0
History	4	1	5	5	3
Health and Human Services -					
Criminal Justice	1	0	4	3	1
Nursing	-	-	1	1	3
Social Work	10	8	9	24	12
Library	1	4	5	8	17
Mathematics	54	59	70	41	35
Music	4	0	0	0	1
Physics	19	24	7	4	5
Political Science	7	4	13	3	8
Psychology	18	13	25	26	76
School - City	12	4	3	0	0
County	2	0	0	0	0
Sociology	7	1	5	0	0
Undergrad. & Special Programs	0	0	2	1	5
Unspecified/System	402	537	401	226	211
UTK (Graduate)	2	5	11	5	20
Word Processing	29	55	51	37	47
TOTAL	1829	1906	1645	883	695

TABLE 9

Number of Jobs Transmitted to UTK Facilities

Month	1984	1985	1986	1987	1988
January	1932	3401	425	52	75
February	5225	6095	1730	69	71
March	4522	4599	2831	78	81
April	5172	6137	3137	44	74
May	3583	1207	667	112	
June	5838	2779	644	96	
July	3756	2154	135	66	
August	3934	416	75	81	
September	5820	5838	231	86	
October	9519	3852	294	88	
November	7264	5603	227	53	
December	2590	508	141	59	
Total	59155	42589	10537	884	301

TABLE 10

Departmental Usage of IBM 4381

Department	Connect Hours FY 1986-87	Connect Hours FY1987-88	CPU Hours FY1986-87	CPU Hours FY1987-88
Academic Computing	2,911	533	13	10
Biology	2	0	0	0
CECA	65,789	60,597	72	99
Computer Science	7,536	11,110	94	186
Engineering	1,491	907	110	56
EPRI	1,900	1,276	90	69
Management	986	1,126	26	168
Marketing	85	62	0	0
MUSIC	80,050	79,728	254	232
Physics	1,302	39	1,072	0
System	126,656	137,749	365	693
Unstated	162	793	5	3
Miscellaneous	232	21,594	27	116
Total	289,102	315,514	2,128	1,632

TABLE 11

Monthly Usage on IBM 4381 System

Department	Connect Hours FY 1986-87	Connect Hours FY1987-88	CPU Hours FY1986-87	CPU Hours FY1987-88
July	17,198	23,335	108	91
August	16,336	21,392	213	68
September	22,224	24,766	77	129
October	26,646	30,267	95	183
November	28,961	28,998	133	186
December	21,974	22,064	226	74
January	25,383	26,635	493	98
February	26,027	29,222	219	159
March	27,657	28,843	169	148
April	30,123	30,974	220	159
May	23,002	23,856	103	178
June	23,571	25,162	72	159
Total	289,102	315,514	2,128	1,632

APPENDIX G

HOURS OF OPERATION OF COMPUTING FACILITIES

TERMINAL ROOMS/COMPUTER LABS
SPRING 1989

OPEN RESOURCES

LABORATORY	OPERATING AGENCY	EQUIPMENT	CLIENTELE	HOURS	A.M.	P.M.
MICROCOMPUTER LABS						
HUNTER 408	CECA	12 IBM XT w/DD	FACULTY, STAFF	M-TH	8:00 -	10:00
	(Hunter 413)	16 APPLE IIGS /DD	AND STUDENTS,	FRI	8:00 -	5:00
		28 MACINTOSH	INVITED PUBLIC	SAT	9:00 -	2:00
		1 IBM PS/2-50	SCHOOL STAFF	SUN	2:00 PM-	8:00
GROTE 226		18 IBM XT w/DD		M-F	8:00 -	5:00
HP SYSTEM TERMINAL CLUSTERS						
GROTE 320	CECA	9 CRTs	** AS ABOVE **	M-TH	8:00 -	8:00
		4 DECWRITERS		FRI	8:00 -	5:00
HOLT 101	CECA	5 CRTs	** AS ABOVE **	** AS ABOVE **		
		3 DECWRITERS				
FLETCHER 307D	CECA	3 CRTs	** AS ABOVE **	** AS ABOVE **		
		2 DECWRITERS				
LIBRARY	CECA	15 CRTs	** AS ABOVE **	M-TH	7:50 -	11:59
		1 DECWRITER		FRI	7:50 -	5:00
	(Plan To Log Off 10 Minutes Before Library Closes.)		SAT	9:00 -	5:00	
				SUN	2:00 PM-	11:59
IBM SYSTEM TERMINAL CLUSTERS						
GROTE 219	CECA	53 IBM 3179 TERM	** AS ABOVE **	M-TH	8:00 -	8:00
		1 TELEX PRINTER		FRI	8:00 -	5:00

RESTRICTED RESOURCES

DEPARTMENTAL LABS						
FRIST 203	COMMUNICATION	16 MACINTOSH "PLUS"	COMMUNICATION STUDENTS ONLY	M-F	8:00 -	5:00
FLETCHER 404	BUSINESS SCHOOL	21 IBM PC	SCHOOL OF	M-TH	9:00 -	10:00
		4 IBM 3179 TERM	BUSINESS	FRI	9:00 -	5:00
			STUDENTS ONLY	SAT	9:00 -	5:00
GROTE 204	COMPUTER SCIENCE	1 ALTOS	COMPUTER	BY RESERVATION		
		1 NCR MINICOMP	SCIENCE			
		1 PLOTTER	FACULTY AND			
		3 GRAPHIC TERM	STUDENTS ONLY			
GROTE 318	PHYSICS	2 APPLE II	PHYSICS	OPEN DURING		
		2 MACINTOSH	FACULTY AND	BUSINESS HOURS		
		1 LISA	STUDENTS	UPON REQUEST		
GROTE 216	ENGINEERING	12 IBM PS/2-50	ENGR STUDENTS	BY RESERVATION		
RACE 209	SPECIAL SERVICES	20 MACINTOSH	SPECIAL SERVICES	M-FR	8:00 -	5:00
HUNTER 401	CECA	5 MAC SE	FACULTY ONLY	M-FR	8:00 -	5:00
		2 MAC II				
		1 LASER PRINTER				
		3 IBM PS/2				

APPENDIX H

INFORMATION ON THE MEMBERS OF THE STUDY TEAM

APPENDIX H

INFORMATION ON THE MEMBERS OF THE STUDY TEAM

Deborah E. Arfken, Ed.D. Associate Professor of Human Services and Coordinator of Writing Services. In charge of the Writing Developmental Laboratory. Appointed to the UTC faculty in 1980.

Terrance M. Carney, Ph.D. Professor of Engineering and Director of Electrical Engineering and Computer Applications. Appointed to the UTC faculty in 1970.

Elisabeth M. Craig, Ed.D. Supervisor of User Services for CECA. Appointed to the UTC Administrative Staff in 1974.

Lloyd D. Davis, Ed.D. Professor of Education and Computer Curriculum Integration Coordinator. Original Director of CECA. Appointed to the UTC faculty in 1970.

Parthasarati Dileepan, Ph.D. Assistant Professor of Business Administration. Appointed to the UTC faculty in 1985.

Edward R. Rozema, Ph.D. Professor of Mathematics. Appointed to the UTC faculty in 1973.

Randolph L. Whitson, M.L.S. Associate Professor and Assistant Dean of Libraries. Manager of Lupton Library Computer Services. Appointed to the UTC faculty in 1979.

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